PROLiNK®

# Hurricane 9200/S

*ADSL-Ethernet Router*

User's Guide

Revision 1.0

# Product Support and Contact Information

At PROLiNK, we are committed to give you the best products as well as the best technical support for your product. If there is any virus in your system, we can provide suggestions like where you can find a solution to remove the virus, but we would be unable to assist you until the virus is eradicated

## Singapore Service Centre

**Tel:** (65)62965455

**Fax:** (65)63925455

**Email:** support@fida.com

**Address:** Blk 105 Boon Keng Rd #06-13, Singapore 339776

**Operating Hours**: Mon-Fri :0900-1745 hrs Sat : 0900-1300 hrs

## Malaysia Service Centre

**Tel:** (603) 8023 9151

**Fax:** (603) 8024 9161

**Email:** support_my@fida.com

**Address:**29 Jalan USJ 1/31,47600 Subang Jaya, Selangor Darul Ehsan, Malaysia

**Operating Hours:** Mon-Fri: 0900-1730 hrs Sat: 0900-1300 hrs

# www.fida.com

© Copyright 2005 Fida International (S) Pte Ltd

Windows 98, Windows NT, Windows 2000, Windows Me and Windows XP are registered Trademarks of Microsoft Corporation.

# Table of Contents


About this User's Guide ..... 11

Using this Document ..... 12

Notational conventions ..... 12

Typographical conventions ..... 12

Special messages ..... 12

## *Part 1*
## *Getting Started*

About Part 1 ..... 14

**1 Getting to Know the Hurricane 9200/S ..... 15**

Features ..... 15

System Requirements ..... 15

Parts Check ..... 16

**2 Quick Start ..... 17**

Quick Start Part 1 — Connecting the Hardware ..... 17

Step 1. Connect the ADSL cable and optional telephone. ..... 18

Step 2. Connect the Ethernet cable. ..... 18

Install USB software and connect the USB cable (H9200 only) ..... 18

Step 3. Attach the power connector. ..... 19

Step 4. Turn on the Hurricane 9200/S and power up your systems ..... 19

Quick Start Part 2 — Configuring Your Computers ..... 20

Before you begin ..... 20

Windows® XP PCs ..... 20

Windows 2000 PCs ..... 21

Windows Me PCs ..... 22

Windows 95, 98 PCs ..... 23

Windows NT 4.0 workstations ..... 24

Assigning static Internet information to your PCs ..... 25

Connecting a computer to the USB port (H9200 only) ..... 26

Quick Start Part 3 — Configuring the Hurricane 9200/S ..... 29
Logging in to the Hurricane 9200/S Quick Configuration Page ..... 29
Default Router Settings ..... 32
Testing Your Setup ..... 34
**3 Getting Started with the Configuration Manager.35**
Accessing the Configuration Manager ..... 35
Functional Layout ..... 37
Commonly used buttons ..... 37
The Home Page and System View Table ..... 39
Modifying Basic System Information ..... 42
Modifying the Date and Time ..... 42
Specifying the Hurricane 9200/S's Name and Network Domain Name ..... 44
Committing Changes and Rebooting ..... 45
Committing Changes ..... 45
Rebooting the device using Configuration Manager ..... 46

# *Part 2*
# *Interfaces and Operating Modes*

About Part 2 ..... 48
**4 Configuring the LAN and USB Interfaces .....49**
Connecting Your PCs via Ethernet and/or USB ..... 49
Configuring the LAN (Ethernet) Interface ..... 50
Configuring the USB Interface IP Address ..... 53
**5 Configuring WAN Interfaces .....55**
Configuring the ATM VC ..... 56
Modifying ATM VCs ..... 57
Adding ATM VCs ..... 58
Configuring PPP Interfaces ..... 59
Viewing Your Current PPP Configuration ..... 59
Viewing PPP Interface Details ..... 62
Adding a PPP Interface ..... 64
Configuring EoA Interfaces ..... 65
Adding EoA Interfaces ..... 67

Configuring IPoA Interfaces ..... 70
Adding IPoA Interfaces ..... 72

**6 Configuring the System Operating Modes .....74**

Overview of Bridges and Routers ..... 74
How Bridges Work ..... 74
How Routers Work ..... 75
Overview of System Operating Modes ..... 76
Configuring Routable and Bridgeable Interfaces ..... 78
Making Interfaces Routable (IP-Enabled) ..... 78
Making Interfaces Bridgeable (Bridge-Enabled) ..... 78
Enabling Bridging Mode ..... 80
Common Scenarios ..... 81
Scenario 1: Routed Connection to ISP ..... 81
Scenario 2: Bridged Connection to ISP ..... 82
Scenario 3: Routed and Bridged Connections to ISP ..... 83
Configuring Special Bridging Features ..... 84
Configuring WAN-to-WAN Bridging ..... 84
Configuring Bridge/Router AutoSense (BRAS) Mode ..... 85
Configuring ZIPB Mode ..... 86

***Part 3***
***Routing and IP-Related Features***

About Part 3 ..... 90

**7 Viewing System IP Addresses and IP Performance Statistics .....91**

Viewing the Hurricane 9200/S's IP Addresses ..... 91
Viewing IP Performance Statistics ..... 92

**8 Configuring Dynamic Host Configuration Protocol .....93**

Overview of DHCP ..... 93
What is DHCP? ..... 93
Why use DHCP? ..... 93
Hurricane 9200/S DHCP modes ..... 94
Configuring DHCP Server ..... 95

Guidelines for creating DHCP server address pools ..... 95
Adding DHCP Server Address Pools ..... 96
Viewing, modifying, and deleting address pools ..... 98
Excluding IP addresses from a pool ..... 99
Viewing current DHCP address assignments ..... 99
Configuring DHCP Relay ..... 100
Setting the DHCP Mode ..... 101

**9 Configuring DNS Server Addresses ..... 103**

About DNS ..... 103
Assigning DNS Addresses to PCs ..... 103
Configuring DNS Relay ..... 104

**10 Configuring IP Routes ..... 106**

Overview of IP Routes ..... 106
IP routing versus telephone switching ..... 106
Hops and gateways ..... 107
Using IP routes to define default gateways ..... 107
Do I need to define IP routes? ..... 107
Viewing the IP Routing Table ..... 108
Adding IP Routes ..... 110

**11 Configuring the Routing Information Protocol .. 111**

RIP Overview ..... 111
When should you configure RIP? ..... 111
Configuring the Hurricane 9200/S's Interfaces with RIP ..... 112
Viewing RIP Statistics ..... 114

***Part 4***
***Security Features***

About Part 4 ..... 116

**12 Configuring Network Address Translation ..... 117**

Overview of NAT ..... 117
Viewing NAT Global Settings and Statistics ..... 119
Viewing NAT Rules and Rule Statistics ..... 122
Viewing Current NAT Translations ..... 123

Adding NAT Rules ..... 125
The NAPT rule: Translating between private and public IP addresses ..... 125
The RDR rule: Allowing external access to a LAN computer ..... 127
The Basic rule: Performing 1:1 translations ..... 130
The Filter rule: Configuring a Basic rule with additional criteria ..... 131
The Bimap rule: Performing two-way translations ..... 133
The Pass rule: Allowing specific addresses to pass through untranslated ..... 134

**13 Configuring Firewall Settings ..... 135**

Configuring Global Firewall Settings ..... 135
Managing the Blacklist ..... 138

**14 Configuring Filters and Blocking Protocols ..... 139**

Configuring IP Filters ..... 140
Viewing Your IP Filter Configuration ..... 140
Configuring IP Filter Global Settings ..... 141
Creating IP Filter Rules ..... 142
IP filter rule examples ..... 147
Viewing IP Filter Statistics ..... 148
Managing Current IP Filter Sessions ..... 148
Configuring Bridge Filters ..... 150
Configuring Global Bridge Filter Settings ..... 150
Adding Bridge Filter Rules ..... 151
Bridge Filter Rule Example ..... 155
Editing and Deleting Rules and Subrules ..... 156
Viewing Rule Statistics ..... 156
Blocking Protocols ..... 157

***Part 5***
***Administrative Tasks and System Monitoring***

About Part 5 ..... 160

**15 Managing Access to the Configuration Program ..... 161**

Managing User Logins ..... 161
Changing Login Passwords ..... 163
Enabling Management through the WAN Port ..... 164
Configuring SNMP ..... 165
Creating Communities ..... 165
Adding Hosts to Communities ..... 166
Viewing Hosts ..... 166
Viewing Global SNMP Statistics ..... 166

**16 Monitoring System Status and Performing Diagnostics ..... 167**

Viewing System Alarms ..... 167
Viewing the Alarm Table ..... 167
Viewing the System Log ..... 168
Viewing DSL Information ..... 169
Using Diagnostics ..... 174
Running the Diagnostics Program ..... 174
Using the Ping Utility ..... 175
Using the Traceroute Utility ..... 176

**17 Upgrading the Software and Storing and Restoring the Configuration Data ..... 178**

Upgrading the Image ..... 178
Upgrading Using an Image Stored Locally ..... 178
Uploading an Image Stored Remotely ..... 179
Storing and Restoring Configuration Settings ..... 180

**18 Modifying Port Settings ..... 182**

Overview of IP port numbers ..... 182
Modifying the Hurricane 9200/S's Port Numbers ..... 182

**19 Configuring Autodetect ..... 184**

How Autodetect Works ..... 184
Autodetect Modes ..... 184
Configuring Autodetect ..... 185

**A IP Addresses, Network Masks, and Subnets ..... 186**

IP Addresses ..... 186
Structure of an IP address ..... 186
Network classes ..... 187
Subnet masks ..... 187

**B Troubleshooting ..... 189**

**C Glossary.....191**

**Index 199**

# About this User's Guide

This User's Guide shows you how to set up the Hurricane 9200/S ADSL Bridge/Router and how to customize its configuration to meet the needs of your network and Internet connection type.

This document is organized in five major parts, each containing several chapters:

- **Part 1, "Getting Started,"** describes the product features, provides quick start setup instructions, and explains basic configuration information you will need to begin using the Hurricane 9200/S.

  Read the chapters in Part 1 before attempting to use or configure the device. Depending on your LAN and Internet connection requirements, no additional configuration may be needed before you begin using the device.

- **Part 2, "Interfaces and Operating Modes,"** describes the available operating modes and how to configure them. Part 2 also provides detailed configuration instructions for each of the Hurricane 9200/S's interfaces. These instructions will be of particular use when your network or Internet connection requirements differ from those reflected in the default product settings.
- **Part 3, "Routing and IP-Related Features,"** provides configuration instructions and detailed information on using the Hurricane 9200/S's routing features, such as DHCP server, DNS relay, and IP routes.
- **Part 4, "Security Features,"** describes how to configure Network Address Translation (NAT) and the embedded firewall, and how to create your own data filters.
- **Part 5, "Administrative Tasks and System Monitoring,"** provides instructions for network and system administrators on controlling access to the Hurricane 9200/S's configuration software, viewing system performance statistics, diagnosing problems, upgrading the system software, managing the configuration, and configuring special features.

The document's appendices explain basic Internet and networking concepts and provide solutions to common troubleshooting issues. A glossary and an index are provided for your reference.

## Using this Document

### Notational conventions

- Acronyms are defined the first time they appear in text and in the glossary (Appendix C).
- The Hurricane 9200/S is also referred to as the *ADSL/Ethernet router* or, for brevity, the *device*.
- The terms *LAN* and *network* are used interchangeably to refer to a group of Ethernet-connected computers.

### Typographical conventions

- *Italics* are used to identify terms that are defined in the glossary (Appendix A).
- **Bolded** text is used to identify items you select from menus and drop-down lists, and text strings you type.

### Special messages

This document uses the following icons to call your attention to specific instructions or explanations.

**Note**

*Provides clarifying or non-essential information on the current topic.*

**Definition**

*Explains terms or acronyms that may be unfamiliar to many readers. These terms are also included in the Glossary.*

**WARNING**

*Provides messages of high importance, including messages relating to personal safety or system integrity.*

# *Part 1*

## *Getting Started*

# About Part 1

Part 1 provides an overview of the Hurricane 9200/S's features and basic setup and configuration instructions. All users are encouraged to follow these setup instructions when first installing the Hurricane 9200/S on a network.

Some users may find these instructions sufficient to begin using the device on their network, with no additional changes required to the product settings.

Part 1 contains the following chapters:

- **Chapter 1, "Getting to Know the Hurricane** 9200/S**,"** describes the product features and provides a parts list.
- **Chapter 2, "Quick Start,"** provides instructions for setting up the hardware and for performing initial configuration of the Hurricane 9200/S and your LAN PCs.
- **Chapter 3, "Getting Started with the Configuration Manager,"** provides basic instructions for using the Hurricane 9200/S's configuration program. Detailed instructions for modifying each setting are provided in subsequent chapters.

# 1 Getting to Know the Hurricane 9200/S

## Features

- Internal ADSL modem for high-speed Internet access
- 10/100Base-T Ethernet router to provide Internet connectivity to all computers on your LAN
- USB port for connecting a USB-enabled PC (H9200 only)
- Network address translation (NAT), firewall, and IP filtering functions to provide security for your LAN
- Network configuration through DHCP Server and DHCP Relay
- Services including IP route and DNS server configuration, RIP, and IP and DSL performance monitoring
- Configuration program you access via your Web browser

## System Requirements

In order to use the Hurricane 9200/S ADSL/Ethernet router, you must have the following:

- ADSL service up and running on your telephone line.
- One or more computers each containing an Ethernet 10Base-T/100Base-T network interface card (NIC) and/or a single computer with a USB port (H9200 only)
- An Ethernet hub or switch, if you are connecting the device to more than one computer on an Ethernet network
- For system configuration using the supplied web-based program: a web browser such as Internet Explorer v5.0 or later, or Netscape v6.1 or later

## Parts Check

In addition to this document, your Hurricane 9200/S should arrive with the following:

- Hurricane 9200/S ADSL Ethernet Bridge/Router
- Power adapter and power cord
- USB cable (H9200 only)
- Setup CD
- Ethernet cable
- Standard phone/DSL line cable

# 2 Quick Start

This Quick Start provides basic instructions for connecting the Hurricane 9200/S to a computer or LAN and to the Internet.

- Quick Start Part 1 describes setting up the hardware.
- Quick Start Part 2 describes how to configure Internet properties on your computer(s) and how to install the software for using a computer attached to the USB port (H9200 only).
- Quick Start Part 3 shows you how to configure basic settings on the Hurricane 9200/S to get your LAN or PC connected to the Internet.

After setting up and configuring the device, you can follow the instructions on page 34 to verify that it is working properly.

This Quick Start assumes that you have already established ADSL service with your Internet service provider (ISP). These instructions provide a basic configuration that should be compatible with your home or small office network setup. If necessary, refer to the subsequent chapters for additional configuration instructions.

## Quick Start Part 1 — Connecting the Hardware

In Quick Start Part 1, you connect the device to the phone jack, the power outlet, and your computer or network.

**WARNING**

***Before you begin, turn the power off for all devices.*** *These include your computer(s), your LAN hub/switch (if applicable), and the Hurricane 9200/S.*

Figure 1 illustrates the hardware connections. The layout of the ports on your device may vary from the layout shown. Refer to the steps that follow for specific instructions.

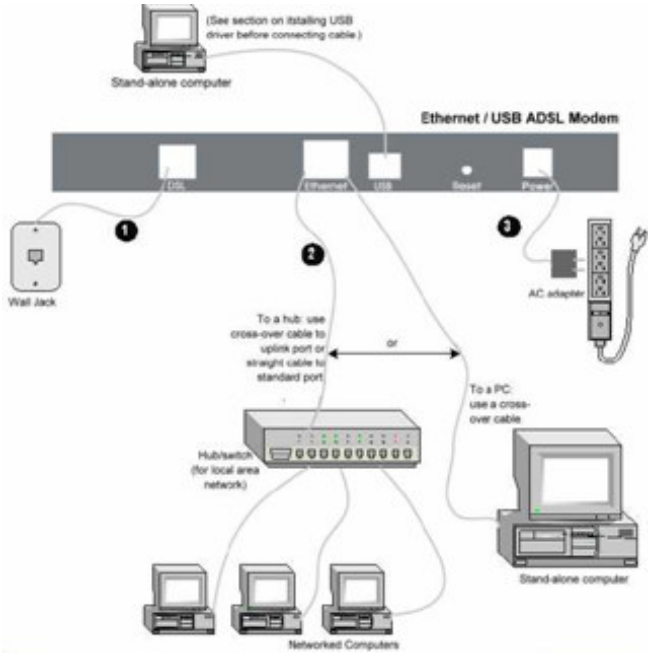



***Figure 1. Overview of Hardware Connections***

### Step 1. Connect the ADSL cable and optional telephone.

Connect one end of the provided phone cable to the port labeled LINE on the rear panel of the device. Connect the other end to your wall phone jack. (Optional: connect your regular telephone to the PHONE port of the device)

### Step 2. Connect the Ethernet cable.

If you are connecting a LAN to the Hurricane 9200/S, attach one end of the provided Ethernet cable to a regular hub port and the other end to the Ethernet port on the Hurricane 9200/S.

If you are using the Hurricane 9200/S with a single computer and no hub, you must use a "crossover" Ethernet cable to attach the PC directly to the device. The crossover cable is wired differently than the cable you would use to connect to a hub. When you compare the colored wires on each end of a straight-through cable, they will be in the same sequence; on crossover cables, they will not. Contact your ISP for assistance.

### Install USB software and connect the USB cable (H9200 only)

You can attach a single computer to the device using a USB cable. The USB port is useful if you have a USB-enabled PC that does not have a network interface card for attaching to your Ethernet network. You must install software on the PC to enable communication; see Connecting a computer to the USB port on page 26.

**Step 3. Attach the power connector.**

Connect the AC power adapter to the Power connector on the back of the device and plug in the adapter to a wall outlet or power strip.

**Step 4. Turn on the Hurricane 9200/S and power up your systems.**

Press the On/Off switch on the back panel of the device to the On position. Turn on and boot up your computer(s) and any connected LAN devices such as hubs or switches.

## Quick Start Part 2 — Configuring Your Computers

Quick Start Part 2 provides instructions for configuring the Internet settings on your computers to work with the Hurricane 9200/S.

### Before you begin

By default, the Hurricane 9200/S automatically assigns all required Internet settings to your PCs. You need only to configure the PCs to accept the information when it is assigned.

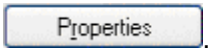
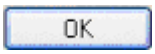
Note

*In some cases, you may want to assign Internet information manually to some or all of your computers rather than allow the Hurricane 9200/S to do so. See "Assigning static Internet information to your PCs" on page 25 for instructions.*

- If you have connected your PC via the USB port, see the USB configuration instructions on page 26 (H9200 only).
- If you have connected your PC(s) or LAN via Ethernet to the Hurricane 9200/S, follow the instructions that correspond to the operating systems installed on your PCs.

### Windows® XP PCs

1. In the Windows task bar, click , and then click **Control Panel**.
2. Double-click the Network Connections icon.
3. In the LAN or High-Speed Internet window, right-click on the icon corresponding to your network interface card (NIC) and select **Properties**. (Often, this icon is labeled *Local Area Connection*).

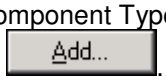
   The Local Area Connection dialog box displays with a list of currently installed network items.
4. Ensure that the check box to the left of the item labeled Internet Protocol TCP/IP is checked, and click  .
5. In the Internet Protocol (TCP/IP) Properties dialog box, click the radio button labeled **Obtain an IP address automatically**. Also click the radio button labeled **Obtain DNS server address automatically**.
6. Click  twice to confirm your changes, and close the Control Panel.

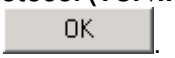
### Windows 2000 PCs

First, check for the IP protocol and, if necessary, install it:

1. In the Windows task bar, click the Start button, point to **Settings**, and then click **Control Panel**.
2. Double-click the Network and Dial-up Connections icon.
3. In the Network and Dial-up Connections window, right-click the Local Area Connection icon, and then select **Properties**.

   The Local Area Connection Properties dialog box displays with a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled. Skip to step 10.
4. If Internet Protocol (TCP/IP) does not display as an installed component, click

.
5. In the Select Network Component Type dialog box, select **Protocol**, and then click 

.
6. Select **Internet Protocol (TCP/IP)** in the Network Protocols list, and then click 

.

   You may be prompted to install files from your Windows 2000 installation CD or other media. Follow the instructions to install the files.
7. If prompted, click

to restart your computer with the new settings.

Next, configure the PCs to accept IP information assigned by the Hurricane 9200/S:

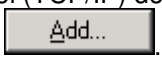
8. In the Control Panel, double-click the Network and Dial-up Connections icon.
9. In Network and Dial-up Connections window, right-click the Local Area Connection icon, and then select **Properties**.
10. In the Local Area Connection Properties dialog box, select **Internet Protocol (TCP/IP)**, and then click

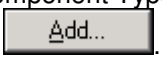
.
11. In the Internet Protocol (TCP/IP) Properties dialog box, click the radio button labeled **Obtain an IP address automatically**. Also click the radio button labeled **Obtain DNS server address automatically**.
12. Click

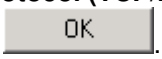
twice to confirm and save your changes, and then close the Control Panel.

### Windows Me PCs

1. In the Windows task bar, click the Start button, point to **Settings**, and then click **Control Panel**.
2. Double-click the Network and Dial-up Connections icon.
3. In the Network and Dial-up Connections window, right-click the Network icon, and then select **Properties**.

   The Network Properties dialog box displays with a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled. Skip to step 11.
4. If Internet Protocol (TCP/IP) does not display as an installed component, click 

.
5. In the Select Network Component Type dialog box, select **Protocol**, and then click 

.
6. Select **Microsoft** in the Manufacturers box.
7. Select **Internet Protocol (TCP/IP)** in the Network Protocols list, and then click 

.

   You may be prompted to install files from your Windows Me installation CD or other media. Follow the instructions to install the files.
8. If prompted, click

to restart your computer with the new settings.

Next, configure the PCs to accept IP information assigned by the Hurricane 9200/S:

9. In the Control Panel, double-click the Network and Dial-up Connections icon.
10. In Network and Dial-up Connections window, right-click the Network icon, and then select **Properties**.
11. In the Network Properties dialog box, select **TCP/IP**, and then click

.
12. In the TCP/IP Settings dialog box, click the radio button labeled **Server assigned IP address**. Also click the radio button labeled **Server assigned name server address**.
13. Click

twice to confirm and save your changes, and then close the Control Panel.

### Windows 95, 98 PCs

First, check for the IP protocol and, if necessary, install it:

1. In the Windows task bar, click the Start button, point to **Settings**, and then click **Control Panel**.
2. Double-click the Network icon.

   The Network dialog box displays with a list of currently installed network components. If the list includes TCP/IP, and then the protocol has already been enabled. Skip to step 9.
3. If TCP/IP does not display as an installed component, click

.

   The Select Network Component Type dialog box displays.
4. Select **Protocol**, and then click

.

   The Select Network Protocol dialog box displays.
5. Click on **Microsoft** in the Manufacturers list box, and then click **TCP/IP** in the Network Protocols list box.
6. Click

to return to the Network dialog box, and then click

again.

   You may be prompted to install files from your Windows 95/98 installation CD. Follow the instructions to install the files.
7. Click

to restart the PC and complete the TCP/IP installation.

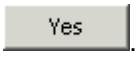
Next, configure the PCs to accept IP information assigned by the Hurricane 9200/S:

8. Open the Control Panel window, and then click the Network icon.
9. Select the network component labeled TCP/IP, and then click

.

   If you have multiple TCP/IP listings, select the listing associated with your network card or adapter.
10. In the TCP/IP Properties dialog box, click the IP Address tab.
11. Click the radio button labeled **Obtain an IP address automatically**.
12. Click the DNS Configuration tab, and then click the radio button labeled **Obtain an IP address automatically**.
13. Click

twice to confirm and save your changes.

    You will be prompted to restart Windows.
14. Click 

.

### Windows NT 4.0 workstations

First, check for the IP protocol and, if necessary, install it:

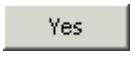
1. In the Windows NT task bar, click the Start button, point to **Settings**, and then click **Control Panel**.
2. In the Control Panel window, double click the Network icon.
3. In the Network dialog box, click the Protocols tab.

   The Protocols tab displays a list of currently installed network protocols. If the list includes TCP/IP, then the protocol has already been enabled. Skip to step 9.
4. If TCP/IP does not display as an installed component, click

.
5. In the Select Network Protocol dialog box, select **TCP/IP**, and then click

.

   You may be prompted to install files from your Windows NT installation CD or other media. Follow the instructions to install the files.

   After all files are installed, a window displays to inform you that a TCP/IP service called DHCP can be set up to dynamically assign IP information.
6. Click 

to continue, and then click

if prompted to restart your computer.

Next, configure the PCs to accept IP information assigned by the Hurricane 9200/S:

7. Open the Control Panel window, and then double-click the Network icon.
8. In the Network dialog box, click the Protocols tab.
9. In the Protocols tab, select **TCP/IP**, and then click

.
10. In the Microsoft TCP/IP Properties dialog box, click the radio button labeled **Obtain an IP address from a DHCP server**.
11. Click

twice to confirm and save your changes, and then close the Control Panel.

### Assigning static Internet information to your PCs

In some cases, you may want to assign Internet information to some or all of your PCs directly (often called "statically"), rather than allowing the Hurricane 9200/S to assign it. This option may be desirable—but not required—if:

- You have obtained one or more public IP addresses that you want to always associate with specific computers (for example, if you are using a computer as a public web server).
- You maintain different subnets on your LAN (subnets are described in Appendix A).

Before you begin, be sure to have the following information on hand. Contact your ISP if necessary:

- The IP address and subnet mask to be assigned to each PC.
- The IP address of the default gateway for your LAN. In most cases, this is the address assigned to the LAN interface on the Hurricane 9200/S. By default, the LAN interface is assigned this IP address: **192.168.1.1**. (You can change this number, or another number can be assigned by your ISP. See Chapter 4 for more information.)
- The IP address of your ISP's Domain Name System (DNS) server.

On each PC, follow the instructions on pages 20 through 24 relating only to checking for and/or installing the IP protocol. Once it is installed, continue to follow the instructions for displaying Internet Protocol (TCP/IP) properties. Instead of enabling dynamic assignment of the IP addresses for the computer, DNS server, and default gateway, click the radio buttons that enable you to enter the information manually.

**Note**

*Your PCs must have IP addresses that place them in the same subnet as the Hurricane 9200/S's LAN interface. If the IP addresses you manually assign to your LAN PCs are in a different subnet than the LAN interface, follow the instructions in Chapter 4 to change the LAN interface IP address as needed.*

### Connecting a computer to the USB port (H9200 only)

If you use the Hurricane 9200/S's USB port to connect to a PC, you must install the provided USB driver software on the PC. The driver enables Ethernet-over-USB communication with the Hurricane 9200/S.

Configuring the USB computer is a two-part process:

- In USB Driver Installation Part 1, you install the USB driver on the PC.
- In USB Driver Installation Part 2, you configure the IP properties on the PC.

### USB Driver Installation Part 1. Installing the USB Driver on the PC:

1. Ensure that the USB cable **is not connected** to the USB port on the PC. The installation program will prompt you when to connect the cable.
2. Copy the USB installation files to a temporary directory on the USB computer.
3. In the folder where you copied the files, double-click on *setup.exe* to start the DSL Modem Setup Wizard.
4. The Installing window displays as the Wizard prepares your system for the installation:

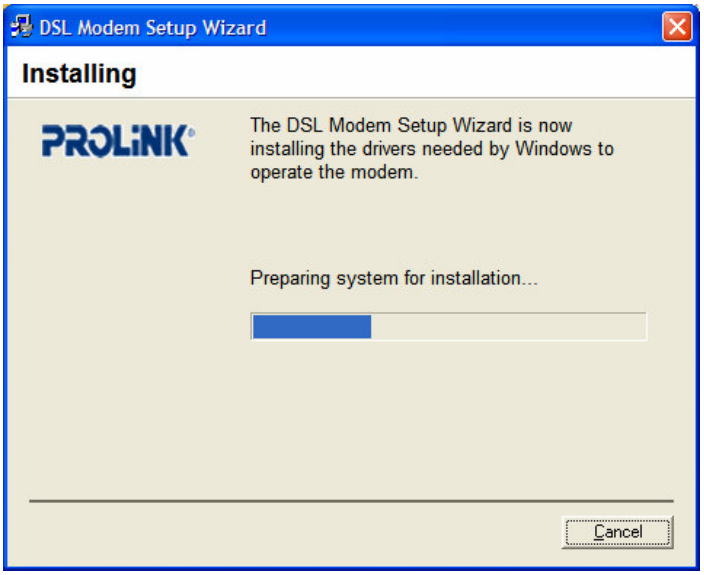

DSL Modem Setup Wizard
Installing
PROLINK
The DSL Modem Setup Wizard is now installing the drivers needed by Windows to operate the modem.
Preparing system for installation...
Cancel

***Figure 2. USB Setup Wizard: Installing Page***

If a Microsoft digital signature dialog box displays, click Yes to continue.

The Installer begins copying the necessary installation files to the required locations. When complete, a window displays, prompting you to connect the USB cable to your computer.

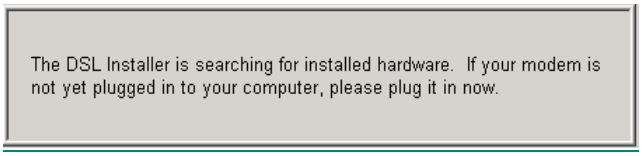

The DSL Installer is searching for installed hardware. If your modem is not yet plugged in to your computer, please plug it in now.

***Figure 3. USB Setup Wizard—Prompt for Hardware Plug In***

5. Connect the USB cable to the ADSL-Ethernet router and to your computer.

   The provided USB cable provided has a flat connector on one end (called Type A) and a square connector on the other (Type B). Connect the flat connector to your PC and the square connector to the Hurricane 9200/S. See Figure 4.

***Figure 4. USB Cable Connectors***

If a Microsoft digital signature dialog box again displays, click Yes to continue.

A window displays briefly, indicating that the system has found new hardware, and the wizard requires you to reboot your computer to complete the installation:

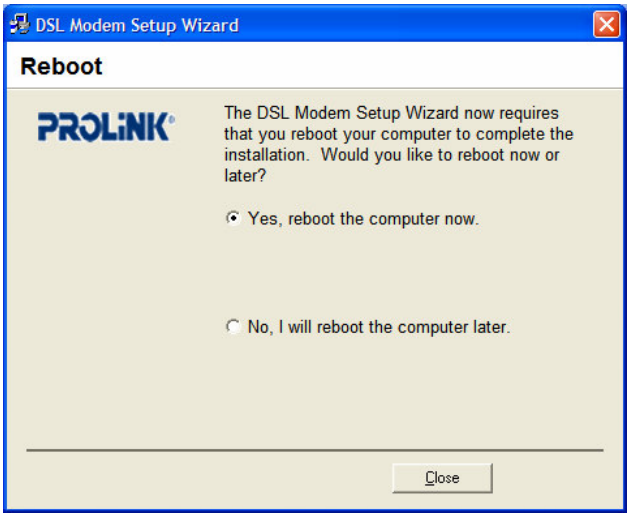

DSL Modem Setup Wizard
Reboot
PROLiNK
The DSL Modem Setup Wizard now requires that you reboot your computer to complete the installation. Would you like to reboot now or later?
Yes, reboot the computer now.
No, I will reboot the computer later.
Close

***Figure 5. DSL Modem Setup Wizard—Finished Page***

6. Click Close to reboot.

You are now finished installing the driver. After restarting your computer, proceed to USB Driver Installation Part 2 to configure IP properties on the USB PC.

**USB Driver Installation Part 2. Configuring IP properties on the USB PC.** Now that the USB driver installation is complete, you must configure the USB PC so that its IP properties place it in the same subnet as the Hurricane 9200/S's USB port. There are two ways to do this:

- The Hurricane 9200/S is configured to assign an appropriate IP address to the USB PC. If you want to use this automatic assignment feature, called "DHCP server," you must configure the USB PC to accept dynamically assigned IP information. Follow the instruction on pages 20 through 24 that correspond to the operating system installed on your PC.
- If you want to assign a static IP address to the PC, follow the instructions on page 25 and use the following information:
  - In the Network and Dial-up Connections window, be sure to select the icon that corresponds to your new USB connection (not the one that corresponds to your Ethernet NIC). When you display properties for the icon, the following text should display in the Connect Using text box:

    *PROLiNK H9200 USB LAN Modem #n*
  - The USB interface on the Hurricane 9200/S is preconfigured with these properties:

    *USB interface IP address:* 192.168.1.2
    *USB interface subnet mask:* 255.255.255.0

    Therefore, your PC must be configured as follows:

    | | |
    |---|---|
    | *IP address:* | 192.168.1.*n* where *n* is a number from *3* to *254*. |
    | *Subnet mask:* | 255.255.255.0 |
    | *Default gateway:* | 192.168.1.2 |

## Quick Start Part 3 — Configuring the Hurricane 9200/S

In Quick Start Part 3, you log into the program on the Hurricane 9200/S and configure basic settings for your Internet connection. Your ISP should provide you with the necessary information to complete this step.

### Logging in to the Hurricane 9200/S Quick Configuration Page

The Hurricane 9200/S provides a preinstalled software program called Configuration Manager which enables you to configure the operation of the device via your Web browser. The settings that you are most likely to need to change before using the device display on the Quick Configuration page.

Follow these instructions configure the device settings:

1. At any PC connected to the Hurricane 9200/S via Ethernet or USB (H9200 only), open your Web browser, and type the following URL in the address/location box:

   **192.168.1.1**

   When you press <Return>, you will be prompted to key-in:
   Username: *admin*
   Password: *password*
   after login, click on 'Quick Configuration'. The page shown in Figure 6 should display (see Appendix B, "Troubleshooting," if you receive an error message or the page does not display).

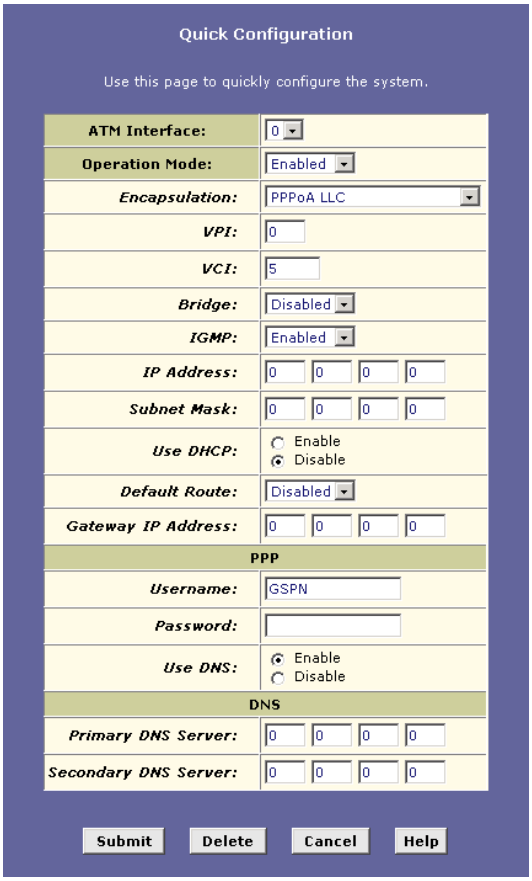



***Figure 6. Quick Configuration Page in Configuration Manager***

The fields are described in the following table. Work with your ISP to determine which settings you need to change and refer to the indicated chapter for more information about each setting.

| Field | Description |
|---|---|
| | **General Settings** |
| *ATM Interface* | Selects the ATM interface you want to use (0). Your system may be configured with more than one ATM interface if you are using different types of services with your ISP. (Chapter 5) |
| *Operation Mode* | Enables or disables the Hurricane 9200/S. When set to "Disabled", the device cannot be used to provide Internet connectivity or routing services for your network. |
| *Encapsulation* | Determines the type of data link your ISP uses to communicate with your ADSL/Ethernet router. (Chapter 5) |
| *VCI and VPI* | Determine the unique data path your modem uses to communicate with your ISP. (Chapter 5) |
| *Bridge* | Enables or disables bridging between the Hurricane 9200/S and your ISP. (Chapter 6) |
| *IGMP* | Used to enable the WAN interface to pass Internet Group Management Protocol messages it receives to the LAN PCs. You must also enable the LAN or USB interfaces for IGMP (Chapter 4). |
| *IP Address* and *Subnet Mask* | If your ISP has provided a public IP address to your LAN, enter the address and the associated subnet mask in the boxes provided. (Note: In bridge configurations, the public IP address may be entered on your PC rather than on the ADSL/Ethernet router; check with your ISP.) (Chapter 5) |
| *Use DHCP* | When enabled, your ISP will assign IP addresses to your WAN interface. When disabled, the WAN interface must (Chapter 5). |
| *Default Route* | When enabled, specifies that the WAN interface IP address specified above will be used as the default route for your LAN. Whenever one of your LAN computers attempts to access the Internet, the data will be sent via this interface. (Chapter 5) |
| *Gateway IP Address* | Specifies the IP address that identifies the ISP server through which your Internet connection will be routed. (Chapter 5) |
| | **PPP Settings** |
| *PPP User Name* and *Password* | The user name and password you use to log in to your ISP. (Note: this is not the same as the user name and password you used to log in to Configuration Manager.) (Chapter 5) |
| *Use DNS* | Specifies whether the DNS server addresses that your LAN will use should be supplied dynamically each time you connect to the ISP. If you click *Disable*, you must configure DNS addresses manually on each PC or on the fields below. (Chapter 5) |
| | **DNS Settings** |
| *Primary/ Secondary DNS Server* | Specifies the primary and secondary domain name system (DNS) server addresses provided by your ISP. (Chapter 9) |

2. When finished customizing these settings, click Submit.

   The settings are now in effect; however, if you reboot or if the power is disconnected, your settings will be lost. In step 3, you save the changes to permanent memory:

3. Click the Admin tab, and then click **Commit & Reboot** in the task bar.

4. Click Commit.

   A page will display briefly to confirm your changes, and then you will be returned to the Commit & Reboot page.

You are now finished customizing basic settings. Read the following section to determine if you need to change additional settings.

**Note**

*On the Quick Configuration page, you can click Delete to remove all existing Quick Configuration settings and return to the default values.*

### Default Router Settings

The Hurricane 9200/S can provide a variety of services to your network. The device is preconfigured with default settings for use with a typical home or small office network.

Table 1 lists some of the most important default settings; these and other features are described fully in subsequent chapters. If you are familiar with network configuration, review the settings in Table 1 to verify that they meet the needs of your network. Refer to the Quick Configuration page instructions (on page 29) or to the document sections referenced in the table for further instructions. If you are unfamiliar with these settings, try using the device without modification, or contact your ISP for assistance.

Before you attempt to modify any settings, review Chapter 3 for general information about accessing and using the Configuration Manager program. We strongly recommend that you contact your ISP prior to changing the default configuration.

***Table 1. Default Settings Summary***

| Option | Default Properties | Explanation/Instructions |
|---|---|---|
| **LAN interfaces — connecting to your network** | | |
| *Ethernet* | Static IP address: 192.168.1.1<br>Subnet mask: 255.255.255.0<br>DHCP server pool of addresses: 192.168.1.3 through 192.168.1.34 | The LAN interface connects the device to your Ethernet network. Typically, you will not need to change the IP address. See Chapter 4 for instructions.<br>The DHCP service (see Chapter 8) is enabled for operation over this interface, with a pool of private IP addresses for dynamic assignment to your LAN computers. To use this service, you must set up your computers to accept IP information dynamically, as described in Quick Start Part 2. |
| *USB (H9200 only)* | Static IP address: 192.168.1.2<br>Subnet mask: 255.255.255.0 | The USB interface can connect to a single USB-enabled computer with an IP address in the same subnet. See Chapter 4 for instructions. |
| **WAN interface — connecting to the Internet** | | |
| *ATM VC* | VPI = 0<br>VCI = 100 | The VPI and VCI values make up a VC (virtual circuit) that determines the path your data must take to connect over the phone lines to the ISP. These values must be changed as directed by your ISP. See Chapter 5 for more information. |
| *PPP interface* | PPPoE interface<br>Login: *guest*<br>Password: *guest* | The PPP interface determines the method of communication with your ISP and logging in to their servers. A particular type of PPP interface – PPP over Ethernet (PPPoE) – is configured by default, with the ISP login information shown. See “Configuring PPP Interfaces” on page 59 for instructions on modifying this information as required by your ISP. |
| **Services** | | |
| *NAT (Network Address Translation)* | NAPT rule enabled | Your computers’ private IP addresses (see DHCP above) will be translated to your public IP address whenever they access the Internet. See Chapter 4 for a description of the NAT service. |

## Testing Your Setup

The Quick Start process should enable any computer on your LAN to use the Hurricane 9200/S to access the Internet.

To test the connection, turn on the device, wait about 30 seconds, and then verify that its LEDs are illuminated as shown in Table 2.

***Table 2. LED Indicators***

| LED | Behavior |
|---|---|
| *Power* | Displays solid green to indicate that the device is turned on. |
| | |
| *Ethernet* | Displays solid green when the Ethernet connection is up. Flashes while data is being sent to and received from your LAN PCs. |
| *ADSL* | Displays solid green when the DSL line is up. Flashes during DSL handshake. |
| *Internet* | Flashes while data is being sent to and received from the Internet. |

If the LEDs illuminate as expected, test your Internet connection from a LAN computer (and from the USB computer, if applicable): Open your web browser and type the URL of any external website (such as *http://www.yahoo.com*). The LED labeled Internet should be blinking rapidly and may appear solid as the device connects to the site.

If the LEDs do not illuminate as expected or the web page does not display, see Appendix A for troubleshooting suggestions. Or, contact your ISP for assistance.

# 3 Getting Started with the Configuration Manager

The Hurricane 9200/S includes a preinstalled program called the *Configuration Manager*, which provides an interface to the software installed on the device. It enables you to configure the device settings to meet the needs of your network. You access it through your web browser from any PC connected to the Hurricane 9200/S via the LAN or USB ports.

This chapter provides basic information on using the Configuration Manager.

## Accessing the Configuration Manager

The Configuration Manager program is preinstalled into memory on the Hurricane 9200/S. To access the program, you need the following:

- A PC or laptop connected to the LAN port on the device as described in the Quick Start chapter.
- A web browser installed on the PC. The program is designed to work best with Microsoft Internet Explorer® version 5.0, Netscape Navigator® version 6.1, or later versions.

You can access the program from any computer connected to the Hurricane 9200/S via the LAN or USB ports (H9200 only).

1. From a computer connected via Ethernet or USB (H9200 only), open your web browser, type the following URL in the web address (or location) box, and press **<Enter>**:

   **`http://192.168.1.1`**

   This is the predefined IP address of the Ethernet interface (however, since the USB interface is in the same subnet as the LAN interface you can use this IP address from a USB computer also).

   A login screen displays:

***Figure 7. Login Screen***

2. Enter your user name and password, and then click OK.

   The first time you log into the program, use these defaults:

   | | |
   |---|---|
   | *Default User Name:* | admin |
   | *Default Password:* | password |

**Note**

*You can change the password at any time (see Chapter 15 for instructions).*

The System View page on the Home tab displays each time you log into the program (shown in Figure 9 on page 38).

## Functional Layout

Configuration Manager tasks are grouped into categories, which you can access by clicking the tabs at the top of each page. Each tab displays the available tasks in a horizontal menu at the top of the page. You can click on these menu items to display the specific configuration options.

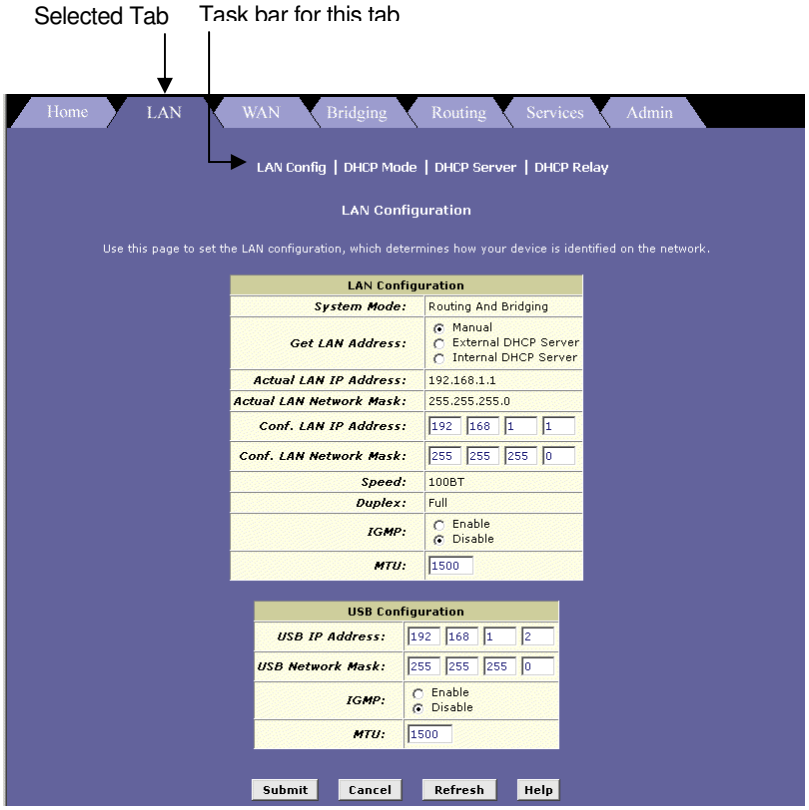



***Figure 8. Web Interface Functional Layout***

A new page displays when you click each task in the task bar. The left-most task displays by default when you click on a new tab. The same task may appear in more than one tab, when appropriate. For example, the Lan Config task displays in both the LAN tab and the Routing tab.

### Commonly used buttons

The following buttons are used throughout the application.

| *Button* | *Function* |
|---|---|
| Submit | Stores in *temporary* system memory any changes you have made on the current page. See “Committing Changes” on page 45 for instructions on storing changes permanently. |
| Refresh | Redisplays the current page with updated statistics or settings. |

| Button | Function |
|---|---|
| Clear | On pages that display accumulated statistics, this button resets the statistics to their initial values. |
| Help | Launches the online help for the current topic in a separate browser window. Help is available from any main topic page. |

## The Home Page and System View Table

The Home page displays when you first access the program or, if another tab is already displaying, when you click on the Home tab.

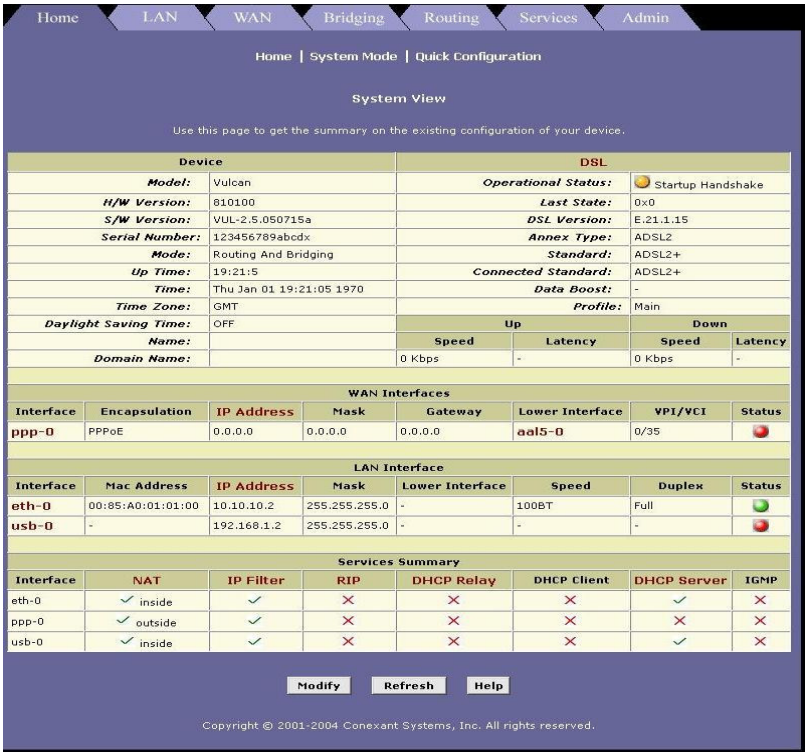
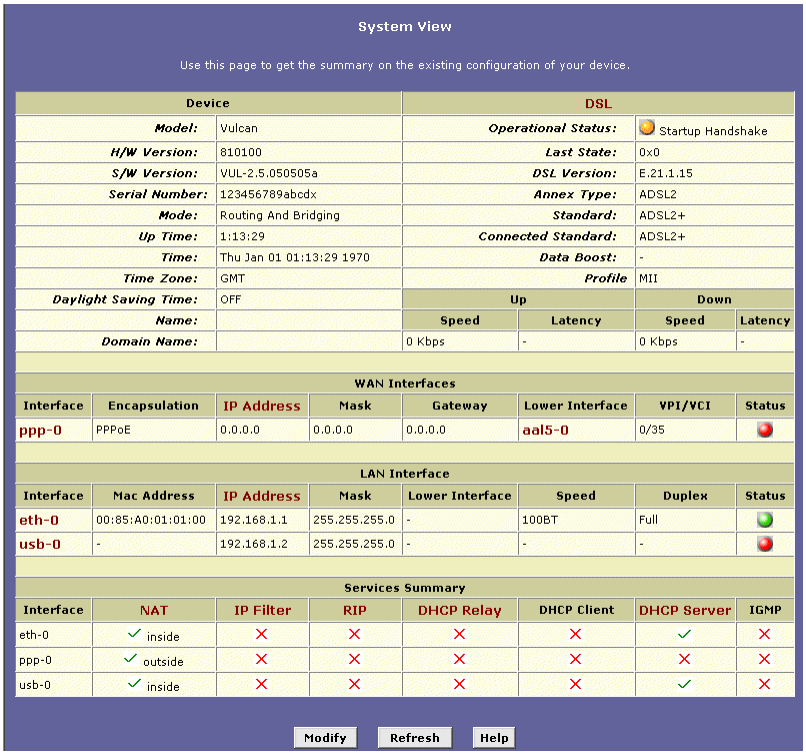



***Figure 9. System View Table***



System View

Use this page to get the summary on the existing configuration of your device.

| Device | | DSL | |
|---|---|---|---|
| Model: | Vulcan | Operational Status: | Startup Handshake |
| H/W Version: | 810100 | Last State: | 0x0 |
| S/W Version: | VUL-2.5.050505a | DSL Version: | E.21.1.15 |
| Serial Number: | 123456789abcdx | Annex Type: | ADSL2 |
| Mode: | Routing And Bridging | Standard: | ADSL2+ |
| Up Time: | 1:13:29 | Connected Standard: | ADSL2+ |
| Time: | Thu Jan 01 01:13:29 1970 | Data Boost: | - |
| Time Zone: | GMT | Profile | MII |
| Daylight Saving Time: | OFF | Up | Down |
| Name: | | Speed / Latency | Speed / Latency |
| Domain Name: | | 0 Kbps / - | 0 Kbps / - |

WAN Interfaces

| Interface | Encapsulation | IP Address | Mask | Gateway | Lower Interface | VPI/VCI | Status |
|---|---|---|---|---|---|---|---|
| ppp-0 | PPPoE | 0.0.0.0 | 0.0.0.0 | 0.0.0.0 | aal5-0 | 0/35 | |

LAN Interface

| Interface | Mac Address | IP Address | Mask | Lower Interface | Speed | Duplex | Status |
|---|---|---|---|---|---|---|---|
| eth-0 | 00:85:A0:01:01:00 | 192.168.1.1 | 255.255.255.0 | - | 100BT | Full | |
| usb-0 | - | 192.168.1.2 | 255.255.255.0 | - | - | - | |

Services Summary

| Interface | NAT | IP Filter | RIP | DHCP Relay | DHCP Client | DHCP Server | IGMP |
|---|---|---|---|---|---|---|---|
| eth-0 | ✓ inside | ✗ | ✗ | ✗ | ✗ | ✓ | ✗ |
| ppp-0 | ✓ outside | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| usb-0 | ✓ inside | ✗ | ✗ | ✗ | ✗ | ✓ | ✗ |

Modify Refresh Help

***Figure 10 System View Table***

The Home page contains the System View table, which provides a snapshot of your system configuration. Note that some settings link to the related pages in Configuration Manager where you can change the data or view details. The following table describes each section of the System View table.

| Table Heading | Description |
|---|---|
| *Device* | Displays basic information about the Hurricane 9200/S hardware and software versions, the system uptime (since the last reboot), and the preconfigured operating mode. |
| *DSL* | Displays the operational status, version, DSL standard, and performance statistics for the DSL line. You can click on DSL in the table heading or display the WAN tab to view additional DSL settings, which are described in Chapter 16. |
| *DSL* | Displays the operational status, version, annex type, connected standard, data boost, profile and performance statistics for the DSL line. You can click on DSL in the table heading or display the WAN tab to view additional DSL settings, which are described in Chapter 16. |

| Table Heading | Description |
|---|---|
| *WAN Interfaces* | Displays the software name(s) and various settings for the device interface(s) that communicate with your ISP via DSL. Although you only have one physical DSL port, multiple software-defined interfaces can be configured to use it. Most users need only one. See Chapter 5 for more information about configuring the WAN interfaces.<br>For each interface, a "Lower Interface" name, such as *aal5-0*, should display. You can click on the lower interface name to view or change the ATM VC settings that this interface uses. |
| *LAN Interface* | Displays the software names and various settings for the device interfaces that communicate directly with your network. These typically include an Ethernet interface named *eth-0*, and may include a USB interface named *usb-0*. Wireless LAN interfaces are not shown. For information on modifying properties of these interfaces, see Chapter 4. |
| *Services Summary* | Displays the status of various services that the Hurricane 9200/S performs to help you manage your network. A green check mark indicates the service is active and a red X indicates that it is inactive:<br>○ NAT: Translates private IP addresses to your public IP address. The type of NAT interface is indicated (inside/outside). (See Chapter 12.)<br>○ IP Filter: Allows setting up filtering rules that accept or deny incoming or outgoing data. (See Chapter 14.)<br>○ RIP: Enables router-to-router communication. (See Chapter 5.)<br>○ DHCP Relay: Enables dynamic assignment of IP information from your ISP to your computers. (See Chapter 8.)<br>○ DHCP Client: Enables dynamic assignment of IP information from your ISP or another computer on your network to the device's LAN interface. (See Chapter 4.)<br>○ DHCP Server: Enables dynamic assignment of IP information from the device's built-in DHCP server to your LAN computers. (See Chapter 8.)<br>○ IGMP: Enables message forwarding from external sources such as your ISP, based on the Internet Group Management Protocol. |

## Modifying Basic System Information

You can modify the system date and time. You can also assign a name to the Hurricane 9200/S and to the network domain in which it resides.

### Modifying the Date and Time

You can set the system date and time manually.

- When you set the date and time manually, the information will be held only as long as the device stays on; if power is turned off or you reboot, the date and time revert to default values and must again be updated.

**Note**

*Setting the Hurricane 9200/S date and time manually, does not affect the date and time on your PCs.*

Follow these instructions to change the system date and time:

1. At the bottom of the Home page, click Modify.

   The System - Modify page displays in a separate browser window:

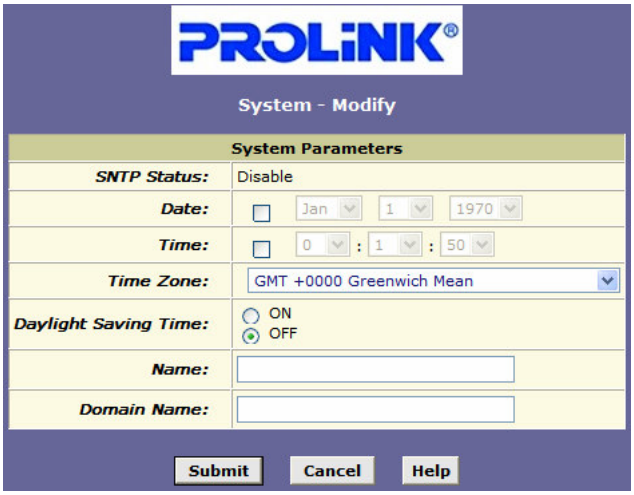



***Figure 11. System - Modify Page***

2. Modify the fields on this page as required. The following table describes each field:

| Option | Description |
|---|---|
| *SNTP Status* | Shows the current status of SNTP Client (Enabled/ Disabled). SNTP Client can be enabled from WAN->SNTP Page. |

| Option | Description |
|---|---|
| *Date and Time* | To set the date and time manually, ensure that the SNTP Client is Disabled. To configure SNTP Client Visit SNTP Page. Click the date and time check boxes to select the appropriate values from the drop-down lists. The time displays in military format. |
| *Time Zone, Daylight Savings Time* | If you are setting the date and time manually, you can select your time zone from the drop-down list, and then click the appropriate radio button to indicate whether Daylight Savings Time is currently in effect.<br>After you initially set the time, turning DST on or off will adjust the current displayed time by one hour in the appropriate direction.<br>You must remember to change the DST option each spring and fall — it will not change automatically. |

3. When you are finished modifying the settings, click Submit, and then click Close to return to the System View page.
4. To save your changes to permanent memory, click the Admin tab, and then click **Commit & Reboot** in the task bar.
5. Click Commit to save your changes to permanent memory.

### Specifying the Hurricane 9200/S's Name and Network Domain Name

You can specify an easy-to-remember name for the Hurricane 9200/S and a domain name for the network on which it resides. These are used only to simplify access to the Configuration Manager program.

The Name and Domain Name fields display on the System-Modify page, as shown in Figure 11 on page 42.

You can set a name only or a name and domain name together.

- If you specify a name only, then the next time you want to access Configuration Manager, you can type this name in the location box in your Web browser instead of typing the numeric IP address. For example, if you named the device *myrouter* (and left the Domain Name field blank), then you could type the following in your Web browser to access Configuration Manager:

  http://myrouter

- If you also specify a domain name for the ADSL-Ethernet router, the next time you access Configuration Manager; type the domain name and the device name in your Web browser. For example, if you entered *myrouter* in the Name field and *mydomain.com* in the Domain Name field, then you would type the following in your Web browser to access Configuration Manager:

  http://myrouter.mydomain.com

After you enter information in these fields, follow steps 3 through 5 on page 43 to save your changes.

**Note**

*Using a name/domain instead of the IP address to access Configuration Manager will work only when the DNS relay feature is enabled. DNS Relay is automatically enabled when the DNS server address configured on your PCs is also the address assigned to the LAN interface on the Hurricane 9200/S. See Chapter 9 for more information.*

## Committing Changes and Rebooting

### Committing Changes

Whenever you use Configuration Manager to change system settings, the changes are initially placed in temporary storage called random access memory or RAM. Your changes are made effective when you submit them, but will be lost if the device is reset or turned off.

You can commit changes to save them permanently to flash memory.

**Definition**

***Submitting*** *changes activates them immediately, but saves them only until the device is reset or powered down.* ***Committing*** *changes saves them permanently.*

Follow these steps to commit changes.

1. Click the Admin tab, and then click **Commit & Reboot** in the task bar.

   The Commit & Reboot page displays:

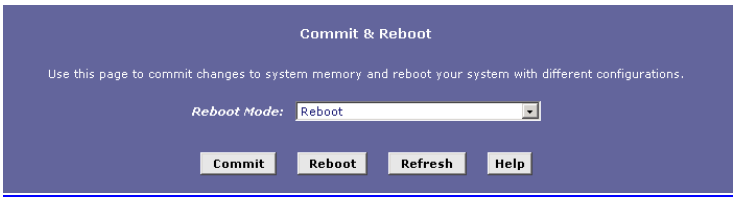



   ***Figure 12. Commit & Reboot Page***

2. Click Commit. (Disregard the selection in the Reboot Mode drop-down list; it does not affect the commit process.)

   The changes are saved to permanent storage.

   The previous settings are copied to backup storage so that they can be recalled if your new settings do not work properly (see the rebooting instructions on page 46).

### Rebooting the device using Configuration Manager

To reboot the device, display the Commit & Reboot page, select the appropriate reboot mode from the drop-down menu, and then click Reboot.

You can select from the following reboot options:

| Option | Description |
|---|---|
| *Reboot* | Reboots using the settings currently in memory, including any changes you made and committed during the current session. |
| *Reboot from Default Configuration* | Reboots the device to default settings provided by your ISP or the manufacturer. Choosing this option erases any custom settings. |
| *Reboot from Backup Configuration* | Reboots the device using the settings that were in effect *prior to* the most recently committed settings. |
| *Reboot from Last Configuration* | Same as *Reboot*. |
| *Reboot from Clean Configuration* | Reboots the device with no configuration. This option will disable access to the Configuration Manager, as no LAN interface will be defined. This option is intended only for technicians who have a serial port connection to the device and knowledge of its command line interface. |
| *Reboot from Minimum Configuration* | Reboots the device with only these settings:<br>○ An Ethernet interface is configured with IP address 192.168.1.1 (mask 255.255.255.0).<br>○ The user login is set to the following:<br>User Name: admin<br>Password: password |

Rebooting may take 20-30 seconds. If your browser appears to be waiting to reconnect, press <F5> on your keyboard to refresh the connection. Or, retype the URL (192.168.1.1 by default) in your browser's address box and press <Enter>. The page should redisplay.

If you have difficulty in reconnecting to Configuration Manager after rebooting, or if the device is not providing Internet connectivity as before, reboot using the *Reboot from Backup Configuration* setting to return to the previous settings.

**WARNING**

*The Hurricane 9200/S provides a Reset button on the back panel (in addition to the power on/off button); do not use it to activate new changes. This button resets the device settings to the manufacturer's default values. Any custom settings will be lost.*

# *Part 2*

## *Interfaces and Operating Modes*

# About Part 2

Part 2 explains how to configure the Hurricane 9200/S's interfaces to communicate with your LAN PC(s) and your ISP. Part 2 also describes the device's operating modes and explains how to configure the interfaces to enable each mode.

**Definitions**

***Interfaces*** *refer to those points in the various communication paths where the Hurricane 9200/S exchanges data with external devices. This document distinguishes between the terms* port *and* interface*: a* ***port*** *is a hardware-based point of entry to or exit from a device. Often, several software-based interfaces can be defined to operate over the same port.*

***Operating modes*** *determine which protocols the device can use to communicate with LAN computers and the ISP, and which product features are made available to the user.*

Part 2 contains the following chapters:

- **Chapter 4, "Configuring the LAN and USB Interfaces,"** explains how to configure the Ethernet and USB interfaces, which connect though distinct ports to your LAN hub/switch and optional USB-enabled PC. Because the Ethernet interface can be used to connect to multiple computers, it is referred to as the *LAN interface*.
- **Chapter 5, "Configuring WAN Interfaces,"** explains how to configure the ATM Virtual Circuit (VC) interface and higher-level interfaces that the device uses to communicate via the DSL port.
- **Chapter 6, "Configuring the System Operating Mode,"** describes the device's operating modes and explains how the LAN and WAN interfaces must be configured to enable each mode.

# 4 Configuring the LAN and USB Interfaces

This chapter describes how to configure the interfaces on the Hurricane 9200/S that communicate with your LAN and USB computers.

## Connecting Your PCs via Ethernet and/or USB (H9200 only)

If you are using the ADSL/Ethernet router with multiple PCs on your LAN, you must connect the LAN via an Ethernet hub or switch to the device's LAN port, also called the Ethernet port.

If you are using a single PC with the ADSL/Ethernet router, you have two connection options:

- You can connect the PC directly to the LAN port using a crossover Ethernet cable. See Appendix B, "Troubleshooting," for a description of crossover versus straight-through Ethernet cables.
- If the PC is USB-enabled, you can connect it directly to the device's USB port (H9200 only). Only one computer can be connected in this manner.

You can also use the USB and Ethernet ports simultaneously, connecting your LAN via the Ethernet port and a standalone PC to the USB port (H9200 only).

**Note**

*LAN and USB interfaces (H9200 only) are preconfigured and cannot be created using Configuration Manager. However, you can modify the properties of an existing interface. If you require a LAN or USB interface that was not preconfigured, contact your ISP for assistance.*

## Configuring the LAN (Ethernet) Interface

In order to use the device as a router on your LAN, Internet Protocol (IP) properties must be assigned to the LAN interface. These properties must identify the interface as residing in the same subnet as the PCs on your LAN. (See Appendix A for an explanation of subnets.)

Default IP properties are assigned to the LAN interface to enable you to connect to it when you configure your PCs as described in the Quick Start.

**Note**

*If the IP addresses that you want to assign to your PCs are not in the same subnet as the default LAN interface, you can use Configuration Manager to change the LAN interface IP properties accordingly. However, because you must access Configuration Manager from a PC in the same subnet as the LAN interface, initially configure one PC as indicated in the Quick Start. Then, access Configuration Manager and change the LAN IP address as required. When done, change the IP properties on the PC to so that it is also in the appropriate subnet.*

If your network uses a DHCP server (other than the ADSL/Ethernet router) to assign IP addresses, you can also configure the device to accept and use a LAN IP address assigned by that server. Similarly, if your ISP performs DHCP serving for your network, you can configure the device to accept an IP address assigned from the ISP's server. In this mode, the ADSL/Ethernet router is considered a *DHCP client* of your (or your ISP's) DHCP server.

**Note**

*The Hurricane 9200/S itself can function as a DHCP server for your LAN computers, as described in Chapter 8,* ***but not for its own LAN interface****.*

Follow these steps to change the default LAN IP properties or to configure the LAN interface as a DHCP client:

1. Log into Configuration Manager and click the LAN tab.

   The LAN Configuration page displays:

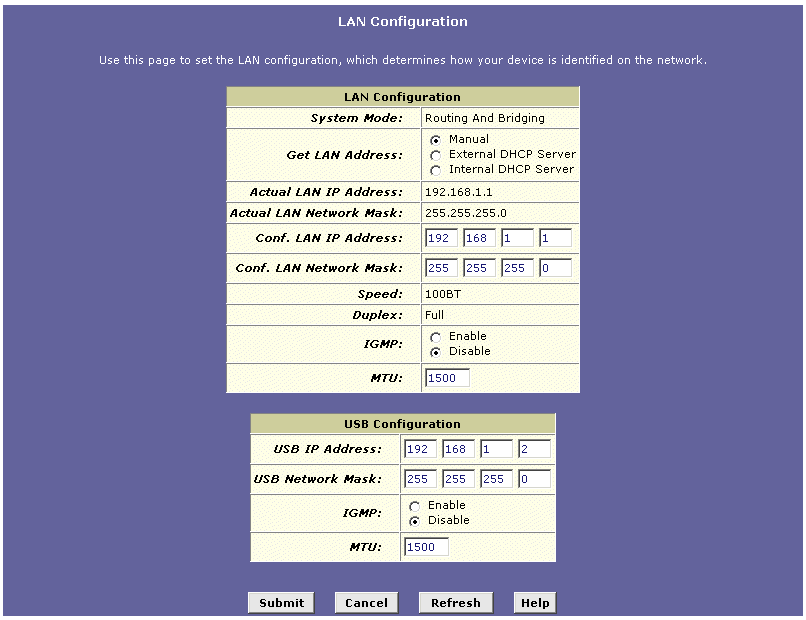



***Figure 13. LAN Configuration Page***

**Note**

*Depending on the preconfigured settings, the LAN Configuration or USB Configuration table may not display. You cannot create these interfaces using Configuration Manager. Contact your ISP for assistance.*

The LAN Configuration table displays the following settings:

| Setting | Description |
|---|---|
| *System Mode* | Identifies the system operating mode for your device, such as Routing mode, Bridging mode, or both modes simultaneously. See Chapter 6 for information on the system operating modes. |
| *Get LAN Address* | Provides options for how the device's LAN interface is assigned an IP address:<br>○ *Manual* indicates that you will be assigning a static IP address, which you can enter in the fields below.<br>○ *External DHCP Server* indicates that your ISP will be assigning an IP address from their own DHCP server, dynamically each time you log on.<br>○ *Internal DHCP Server* indicates that you have a DHCP server device on your network that will assign an address to the port.<br>If you choose either the internal or external server option, the LAN interface is called a DHCP client of the server.<br>Note that the public IP address assigned to you by your ISP **is not** your LAN IP address. The public IP address identifies the WAN (ADSL) port on your ADSL/Ethernet router to the Internet. (Or, in bridge configurations, it may be assigned to your PC.) |

| | |
|---|---|
| *LAN IP Address and Network Mask* | The IP address and network mask for the port. See Appendix A for and overview of IP addresses and masks. |
| *Speed/Duplex* | *Speed* indicates the speed of the Ethernet communication between the ADSL/Ethernet router and the LAN PCs or hub. *Duplex* indicates the type of Ethernet communication (i.e., full duplex, or half-duplex).<br>These settings are not user-configurable. |
| *IGMP* | Indicates whether this interface is enabled with the Internet Group Management Protocol. When enabled, the Ethernet interface collects and consolidates requests from the LAN PCs to receive IGMP messages from external computers. The interface also forwards IGMP messages it receives on its WAN interface to the appropriate hosts. The WAN interface must also be enabled for the IGMP protocol (see the Quick Configuration page and the corresponding instructions on page 29). |
| *MTU* | The Maximum Transmission Unit specifies the size in bytes of the largest Ethernet packet that the interface will accept. Packets larger than this size will be dropped. |

2. Enter an IP address and mask in the fields provided or enable an external or internal DHCP server in the Get LAN Address field. Keep these points in mind:

   - **Manually specifying an address:** If you are using routing services on you LAN such as DHCP and NAT, you must assign a fixed LAN IP address and mask to the interface. The IP address must be in the same subnet as your LAN computers that connect to it. See Appendix A for an explanation of IP addresses and network masks.

     If you change the LAN IP address, you may need to update the DHCP configuration so that the addresses that the DHCP server dynamically assigns to your computers are on the same subnet as the new LAN IP address. See Chapter 8 for instructions on changing the pool of dynamically assigned addresses.

   - **Enabling DHCP:** If you choose to have the LAN interface be a DHCP client of an internal or external server, the LAN Network Mask field will be dimmed and made unavailable for entry. The LAN IP Address field will remain editable, however. The address that you specify here will be used as a request to the DHCP server. This is referred to as a *Configured IP Address* in Configuration Manager. The configured IP address is requested during communication with the DHCP server. If the configured IP address is not available, then system will accept another address from the server. Even if another number is assigned, the same configured IP address will continue to display in this field.

3. If you are using IGMP on your network, click the IGMP Enable radio button (see the explanation of IGMP on page 52).
4. Click Submit.
   - If you changed the LAN IP address while working from a PC that is connected to the device via Ethernet, then your connection will be terminated.
   - If you changed the LAN IP address while working from a PC connected to the device via USB (H9200 only), a page will display to confirm your change and your connection will remain active.
   - If you enabled the DHCP service, the ADSL/Ethernet router will initiate a request for an IP address from your LAN's DHCP server. If a different IP address is assigned than was previously configured, your current connection will be terminated.
5. Reconfigure your PCs, if necessary, so that their IP addresses place them in the same subnet as the new IP address of the LAN interface. See "Quick Start Part 2 — Configuring Your Computers," for instructions.
6. Log into Configuration Manager by typing the new IP address in your Web browser's address/location box.
7. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

## Configuring the USB Interface IP Address (H9200 only)

1. If the LAN Configuration page is not already displaying, click the LAN tab.

   If the USB Configuration table does not display below the LAN Configuration table, then your system does not support a USB connection. Contact your ISP for assistance.
2. In the USB Configuration table, enter the IP Address and Network Mask for the USB interface.

   The IP address must place the USB interface in the same subnet as the USB computer. The USB interface and USB computer can also be in the same subnet as the LAN interface and the computers attached to it.

   For example, if the LAN and USB interfaces are assigned addresses 192.168.1.1 and 192.168.1.2, respectively, then the PCs attached to either port can be assigned addresses in the range 192.168.1.3 through 192.168.1.254.
3. If you are using IGMP on your network, click the IGMP Enable radio button. (See the explanation of IGMP on page 52.)
4. In the MTU field, enter the Maximum Transmission Unit size in bytes. This specifies the largest Ethernet packet that the

interface will accept. Packets larger than this size will be dropped.

5. Click Submit.
   - If you changed the USB interface IP address while working from the USB-attached computer, then the connection will be terminated.
   - If you were using the Ethernet interface, a page will display to confirm your change and your connection will remain active.
6. If necessary, reconfigure your USB PC so that its IP address places it in the same subnet as the new IP address of the USB interface. See "Quick Start Part 2 — Configuring Your Computers," for instructions.
7. Log into Configuration Manager by typing the new USB interface IP address in your Web browser's address/location box.
8. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

# 5 Configuring WAN Interfaces

The Hurricane 9200/S's WAN-side interfaces are used to communication via the DSL port.

A WAN interface comprises two layers—a lower-level ATM VC interface and a higher-level protocol interface:

- The ATM VC interface enables the device to communicate using the *Asynchronous Transfer Mode* protocol. The ATM protocol provides a common format for transmitting data over a variety of hardware systems that make up the backbone of the Internet. The *virtual circuit* (VC) properties of the ATM VC interface identify a unique path that your ADSL/Ethernet router uses to communicate via the ATM-based network with the telephone company central office equipment.
- The higher-level protocol interface(s) operate "on top" of the ATM VC interface. The higher-level interface handles the protocols needed to log onto and exchange data with the ISP's access server. ISPs can use several different protocols, including the Point-to-Point Protocol (PPP), Ethernet-over-ATM (EoA) protocol, or the Internet Protocol-over-ATM (IPoA). Be sure to create the specific type of WAN interface your ISP requires.

The following section describes configuring the AMT interface properties. After you have defined these properties, you can configure one of the higher level WAN interfaces to enable communication with your ISP, as described in the subsequent sections.

## Configuring the ATM VC

The device is preconfigured with an ATM VC interface called *aal5-0*. You may need to change the default VC values associated with the interface to values assigned by your ISP.

To view the current values, log into Configuration Manager, click the WAN tab, and then click **ATM VC** in the task bar. The ATM VC Configuration page displays:

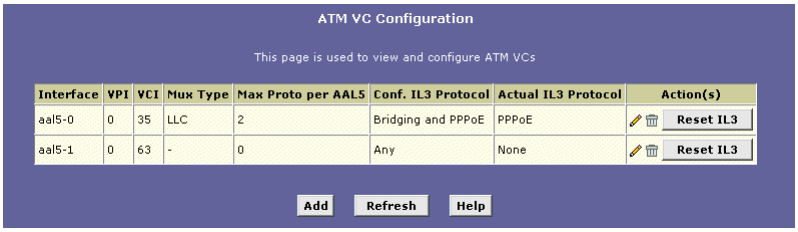



***Figure 14. ATM VC Configuration Page***

**Note**

*The Quick Start instructions in Chapter 2 also include ATM interface configuration via Configuration Manager's Quick Configuration page. You can use either page to configure the required values.*

The ATM VC Configuration table displays the following fields.

| Field | Description |
|---|---|
| *Interface* | The name of the ATM interface to which these VC properties apply. The ATM interface names identify the type of traffic that can be supported, such as data or voice. Internet data services typically use an AAL5-type interface. |
| *Vpi, Vci, and Mux Type* | These settings identify a unique ATM data path for communication between your ADSL/Ethernet router and your ISP. |
| *Max Proto per AAL5* | If you are using an AAL5-type of interface, this setting indicates the number of higher-level interfaces that the VC can support (the higher-level interfaces can be PPP, EoA, or IPoA interfaces). Contact your ISP to determine which type they require. |
| *Actions* | Displays icons you can click on to modify ( ) and delete ( ) the associated interface. You cannot delete an ATM interface if another protocol such as PPP, EoA, or IPoA has been defined to operate over the ATM interface. You must first delete the higher-level interface. |

### Modifying ATM VCs

Your device may contain placeholder values that you must change to establish an ATM connection. Contact your ISP to determine your ATM VC values. Follow these instructions to modify a preconfigured VC:

1. From the ATM VC Configuration page, click in the Actions column for the interface you want to modify.

   The ATM VC Interface – Modify page displays:

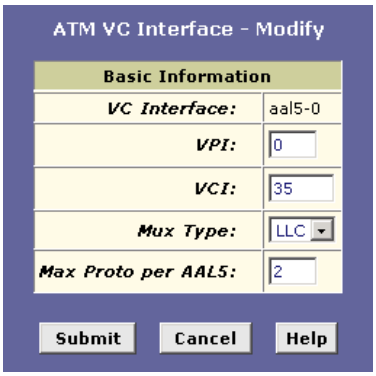



***Figure 15. ATM VC Interface – Modify Page***

2. Enter the new VPI and VCI values, select the MUX type, or change the maximum number of protocols that the VC can carry, as directed by your ISP.
3. Click **Submit**.
4. On the confirmation page, click **Close** to return to the ATM VC Configuration page.
5. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

If you already have defined a higher-level PPP, EoA, or IPoA interface that uses this VC, then you can verify that the new settings work by attempting to access the Internet from a LAN/USB computer. Contact your ISP for troubleshooting assistance.

### Adding ATM VCs

You can create an ATM VC interface if none has been predefined on your system or if you use multiple services with your ISP. Each service may require its own VC. Follow these instructions to add a VC:

1. From the ATM VC Configuration page, click **Add**.

   The ATM VC – Add page displays:

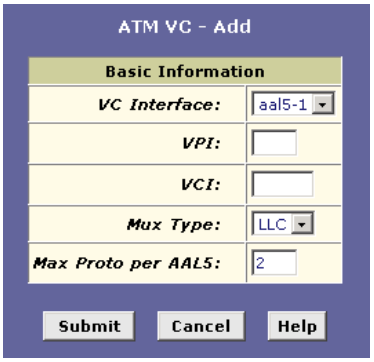



***Figure 16. ATM VC – Add Page***

2. Select an interface name from the VC Interface drop-down list.

   The list begins with the next available ATM VC interface name, in sequential order.

3. Enter the VPI and VCI values assigned by your ISP, and select the mux type from the drop-down list.

4. In the Max Proto per AAL5 text box, enter the number of higher-level protocols (PPP, EoA, and IPoA) that the ISP indicated that you will need to configure to operate over this VC.

   For many users, only one is required.

5. Click **Submit**.

6. When the confirmation page displays, click **Close** to return to the ATM VC Configuration page.

   The new interface should now display in the ATM VC Configuration table.

7. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

You may need to create a new WAN interface, or modify an existing interface, so that it uses the new VC. See the instructions for configuring a PPP (page 59), EoA (page 65), or IPoA (page 69) interface, depending on the type you use to communicate with your ISP.

## Configuring PPP Interfaces

The Point-to-Point Protocol (PPP) is one of several protocols used to enable communication between ISPs and their customers. PPP handles tasks such as the following:

- Identify the type of service the ISP should provide to a given customer
- Identify the customer to the ISP through a username and password login
- Enable the ISP to assign an Internet address and other IP information to the customer's DSL modem

PPP can be used only when your connection with your ISP is a routed connection (i.e., it cannot be used for bridged connections). For more information on bridged and routed connections, see Chapter 6, "Configuring the System Operating Mode."

A PPP interface can be either of two types: PPP over ATM (PPPoA) and PPP over Ethernet (PPPoE). Although to the end user they function similarly, the ISP's network may be configured to handle only one protocol type. Furthermore, an ISP may not use the PPP protocol at all, instead offering EoA-type connections (described on page 65). Contact your ISP before changing the preconfigured WAN interface type.

### Viewing Your Current PPP Configuration

To view your current PPP setup, log into Configuration Manager, click the WAN tab, and then click **PPP** in the task bar. The Point to Point Protocol (PPP) Configuration page displays:

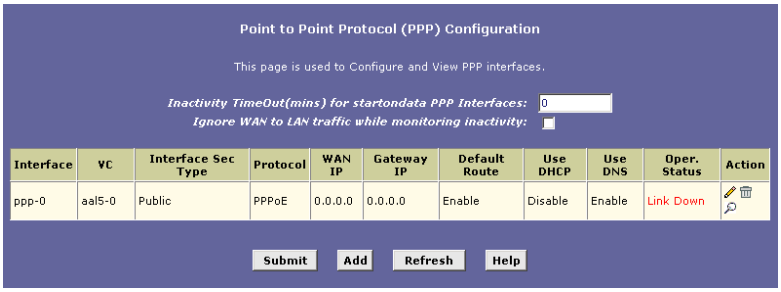



***Figure 17. Point to Point Protocol (PPP) Configuration Page***

A PPP interface is configured as a group of software settings associated with an ATM VC interface. Each PPP interface is given a name, such as *ppp-0*, *ppp-1*. Users typically need only one PPP interface; in some cases, multiple interfaces are created to allow the user to log on to more than one account with the ISP.)

You can configure the following settings on the PPP Configuration page:

- **Inactivity TimeOut...**: The time in minutes that must elapse before a PPP connection times-out due to inactivity. This setting applies only to PPP interfaces that are configured as "start-on-data" interfaces. This type of interface starts up only when it receives data, and then returns to a down state after the specified amount of time (see the status field on page 62).This setting works with the following setting to determine what type of data can activate a start-on-data interface.
- **Ignore WAN to LAN traffic while monitoring inactivity...**: When enabled, data traffic traveling in the incoming direction—from the WAN interface to the LAN interface—will not count as activity on the WAN interface for the purposes of determining whether to make it inactive; i.e., incoming traffic will not activate a start-on-data interface. Only LAN-to-WAN traffic will start the interface.

The PPP Configuration Table displays the following fields:

| Field | Description |
|---|---|
| *Interface* | The name of the PPP interface. |
| *VC* | The virtual circuit over which this PPP data is sent. The VC identifies the physical path the data takes to reach your ISP. |
| *Interface Sec Type* | The type of firewall protections that are in effect on the interface (public, private, or DMZ):<br>○ A public interface connects to the Internet (PPP interfaces are typically public). Packets received on a public interface are subject to the most restrictive set of firewall protections defined in the software.<br>○ A private interface connects to your LAN, such as the Ethernet interface. Packets received on a private interface are subject to a less restrictive set of protections, because they originate within the network.<br>○ The term DMZ (de-militarized zone), in Internet networking terms, refers to computers that are available for both public and in-network accesses (such as a company's public Web server). Packets incoming on a DMZ interface -- whether from a LAN or external source -- are subject to a set of protections that is in between public and private interfaces in terms of restrictiveness. |
| *Protocol* | The type of PPP protocol used. Your ISP may use PPP-over-Ethernet (PPPoE) or PPP-over-ATM (PPPoA). |
| *WAN IP* | The IP address currently assigned by your ISP to the interface. |
| *Gateway IP* | The IP address, provided by your ISP, of the server that provides you access to the Internet. See "Hops and gateways" on page 107 for a description of gateway addresses. |

| Field | Description |
|---|---|
| *Default Route* | Indicates whether the ADSL/Ethernet router should use the IP address assigned to this connection as its default route. Can be Enabled or Disabled. See Chapter 10 for an explanation of default routes. |
| *Use DHCP* | When set to *Enable*, the device will acquire additional IP information from the ISP's DHCP server. The PPP connection itself acquires the device's IP address, mask, DNS address, and default gateway address. With Use DHCP enabled, the device will acquire IP addresses for various other server types (WINS, SMTP, POP3, etc. – these server types are listed on the DHCP Server Configuration page in the LAN tab). |
| *Use DNS* | When set to *Enable*, the DNS address learned through the PPP connection will be distributed to clients of the device's DHCP server. This option is useful only when the ADSL/Ethernet Router is configured to act as a DHCP server for your LAN. When set to *Disable*, LAN hosts will use the DNS address(es) specified in the DHCP pool (see "Configuring DHCP Server" on page 95) and specified in the DNS configuration (see Chapter 9). |
| *Oper. Status* | Indicates whether the link is currently up or down or if a specific type of data exchange is under way (e.g., password authorization or DHCP). |
| *Actions* | You can use these icons to modify ( ), delete ( ), and view additional details on ( ) the PPP interface. Not all settings are available on the PPP Interface - Modify page. To modify the other settings, you must delete the interface and create a new one. Be sure to submit and commit your changes if you make modifications. |

### Viewing PPP Interface Details

When you click to view additional details, the PPP Interface - Detail page displays:

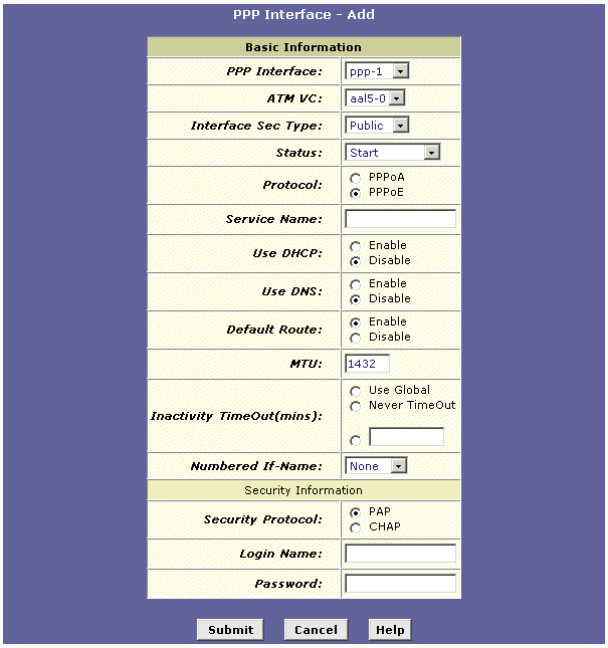



***Figure 18. PPP – Detail Page***

In addition to the properties defined on page 60, the Detail page displays these fields:

| Field | Description |
|---|---|
| *Status* | Indicates which of the following interface statuses has been manually selected:<br>○ Start: The connection will be established for use whenever the device is turned on or rebooted.<br>○ Stop: The PPP interface has been manually disabled and cannot currently be used. It can only be used after being manually returned to the Start state.<br>○ Start On Data: The PPP connection will be established automatically whenever data is sent to the interface (e.g., when a LAN user attempts to use the Internet), and will time-out whenever the interface is idle for a specified amount of time. |
| *Service Name* | (This feature is available with PPPoE interfaces but not with PPPoA interfaces.) The name of the ISP service you are using with this PPP connection. ISPs may offer different types of services (for example, for online gaming or business services), each requiring a different login and other connection properties. |

| Field | Description |
|---|---|
| *Last Fail Cause* | Indicates the action that ended the previous PPP session:<br>○ No Valid PADO Recvd: The device initiated a PPoE handshake but did not receive a packet in reply from the ISP.<br>○ No Valid PADS Recvd: After the initial handshake, the device did not receive a confirmation packet from the ISP.<br>○ Stopped by User: The user stopped the connection (for example, by changing the Configuration Manager settings for the PPP interface.)<br>○ No Activity: The PPP communication timed out, in accordance with the timeout period specified on the PPP Configuration page.<br>○ Auth Failure: The ISP could not authorize the connection based on the user name and/or password provided.<br>○ PADT Recvd: The ISP issued a special packet type to terminate the PPP connection.<br>○ VC down: The Virtual Circuit between the device and the ISP is down.<br>○ Internal failure: A system software failure occurred. |
| *DNS* | The IP address of the DNS server (located with your ISP) used on this PPP connection. |
| *SDNS* | The IP address of the secondary DNS server (located with your ISP) used on this PPP connection. |
| *Security Protocol* | The type of PPP security your ISP uses: *PAP* (Password Authentication Protocol) or *CHAP* (Challenge Handshake Authentication Protocol). |
| *Login Name* | The name you use to log in to your ISP each time this PPP connection is established. |

### Adding a PPP Interface

Follow this procedure to add a PPP interface.

Note

*If you need to use more than one PPP connection, you may be able to create multiple PPP interfaces. The number and type of PPP interfaces you can create depends on the lower-level ATM VC interface type (LLC Mux or VC Mux), the Max Protocol setting for the ATM VC interface, the PPP interface type you want to create (PPPoA or PPPoE), and whether other WAN interface types have already been configured (EoA or IPoA). Contact your ISP for assistance.*

1. From the PPP Configuration Page, click **Add**.

   The PPP Interface – Add page displays:

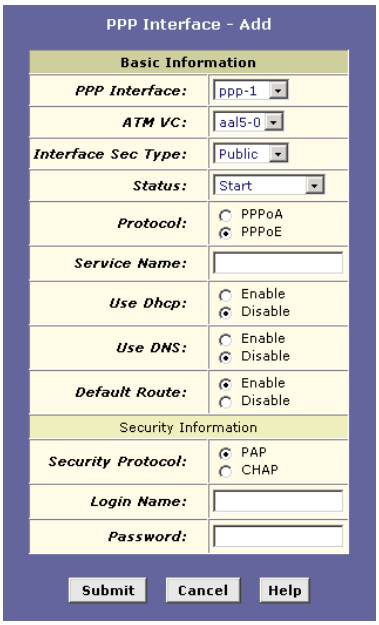



   ***Figure 19. PPP Interface – Add Page***

2. Select a PPP interface name from the drop-down list, and then enter or select data for each field.

   The fields are defined in the tables on page 60 and 62.

3. Click **Submit**.

   A page displays to confirm your changes.

4. Click **Close** to return to the PPP page and view the new interface in the table.

5. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

## Configuring EoA Interfaces

The Ethernet-over-ATM (EoA) protocol is often referred to as *RFC1483*, which is the Internet specification that defines it. It is commonly used to carry data from an Ethernet-based local area network over the ATM-based wide area network.

Unlike PPP, EoA can be implemented to provide a bridged connection between a DSL modem and the ISP. In a bridged connection, data is shared between the ISP's network and their customer's as if the networks were on the same physical LAN. Bridged connections do not use the IP protocol. EoA can also be configured to provide a routed connection with the ISP, which uses the IP protocol to exchange data. See Chapter 6 "Configuring the System Operating Mode," for more information on bridged and routed Internet connections.

Before creating an EoA interface or modifying the default settings, contact your ISP to determine which type of protocol they use.

Note

***PPP and EoA:*** *Bridged Internet connections must use an EoA WAN interface. Routed Internet connections can use an EoA (if configured with an IP address) or a PPP interface. See Chapter 5 for more information.*

To view your current EoA interface configuration, log into Configuration Manager, click the WAN tab, and then click **EOA** in the task bar. The RFC1483/EoA Config page displays.

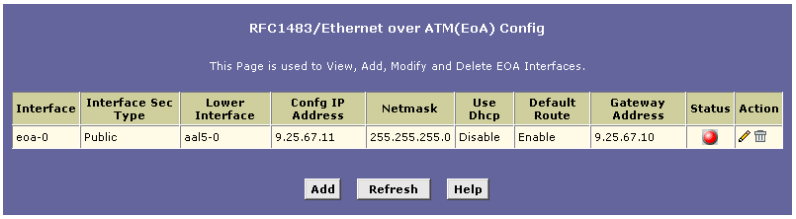



***Figure 20. RFC1483/EoA Config Page***

The EoA table contains a row for each EoA interface currently defined on the device. The table may be empty.

The following table describes the fields on this page:

| Field | Description |
|---|---|
| *Interface* | The name the software uses to identify the EoA interface. |
| *Interface Sec Type* | The type of security protections in effect on the interface (public, private, or DMZ):<br>○ A *public* interface connects to the Internet (IPoA interfaces are typically public). Packets received on a public interface are subject to the most restrictive set of firewall protections defined in the software.<br>○ A *private* interface connects to your LAN, such as the Ethernet interface. Packets received on a private interface are subject to a less restrictive set of protections, because they originate within the network.<br>○ The term *DMZ* (de-militarized zone), in Internet networking terms, refers to computers that are available for both public and in-network accesses (such as a company's public Web server). Packets incoming on a DMZ interface—whether from a LAN or external source—are subject to a level of protection that is in between those for public and private interfaces. |
| *Lower interface* | EoA interfaces are defined in software, and then associated with lower-level software and hardware structures (at the lowest level, they are associated with a physical port —the WAN port). This field should reflect an interface name defined in the next lower level of software over which the EoA interface will operate. This will be an ATM VC interface, such as *aal5-0* . |
| *Config IP Address and Netmask* | The IP address and network mask you want to assign to the interface. If the interface will be used for bridging with your ISP and you will not be using the Hurricane 9200/S as a router on your LAN, then you do not need to specify IP information. If you enable DHCP for this interface, then the Configured IP address will serve only as a request to the DHCP server. The actual address that is assigned by the ISP may differ if this address is not available. |
| *Use DHCP* | When enabled, this setting instructs the device to accept IP information assigned dynamically by your ISP's DHCP server. If the interface will be used for bridging with your ISP and you will not be routing data through it, leave this checkbox unselected. |
| *Default Route* | Indicates whether the Hurricane 9200/S uses the IP address assigned to this interface, if any, as its default route for your LAN. Your system can have only one default route. See Chapter 10 for an explanation of default routes. |
| *Gateway Address* | The external IP address that the ADSL/Ethernet router communicates with via the EoA interface to gain access to the Internet. This is typically an ISP server. |

| Field | Description |
|---|---|
| *Status* | A green or red ball will display to indicate that the interface is currently up or down, respectively. You cannot manually enable or disable the interface; a red ball may indicate a problem with the DSL connection or the connection to the ISPs access server. |
| *Action* | Icons you can click on to edit ( ) or delete ( ) the associated EoA interface.<br>Not all settings are available on the EoA Interface - Modify page. To modify the other settings, you must delete the interface and create a new one. Be sure to submit and commit your changes if you make modifications. |

### Adding EoA Interfaces

Follow these instructions to add an EoA interface:

1. Click the WAN tab, and then click **EOA** in the task bar.
2. Click Add.

   The EoA Interface - Add page displays:

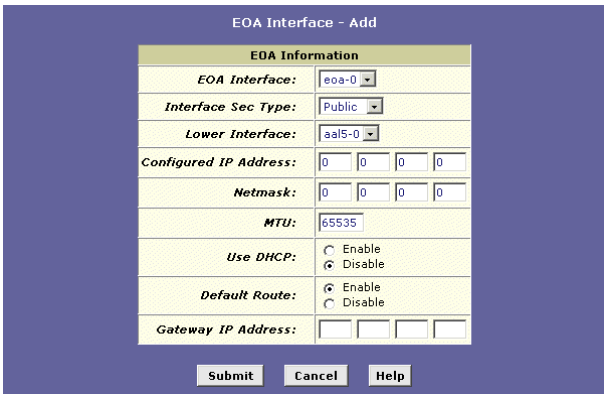



***Figure 21. EoA Interface - Add Page***

3. Select one of the predefined interface names from the EoA Interface drop down list.
4. From the Interface Sec Type drop-down list, select the level of IP Firewall to be used on this interface, as defined on page 66.
5. In the Lower Interface field, select the lower-level interface name over which this protocol is being configured.

If the interface will be used to provide only a bridged connection to your ISP, skip to step 8.

6. If you are creating the EoA interface to provide a routed Internet connection, enter the IP address for the interface in the Conf. IP Address field, and enter the network mask.

   This address serves as the public IP address for your entire LAN and is usually assigned by your ISP.

7. If your ISP will assign the IP address from their DHCP server, click the Enable radio button in the Use DHCP field.

   When DHCP is enabled, the address you entered in the Conf. IP Address field will be requested from the DHCP server; the server many assign a different address if necessary.

8. If you are using the EoA interface to provide a routed connection to your ISP and you want the EoA interface to serve as the default route for Internet access for your LAN, ensure that the Default Route: Enable radio button is selected. (If you have more than on WAN interface, note that only one of them can be specified as the default route.)

   If you are using the interface to provide a bridged connection, then deselect this field.

9. In the Gateway IP Address field, enter the address of your ISP's access server.

10. Click Submit.

    A confirmation page displays to confirm your changes.

11. Click Close to return to the EoA page and view the new interface in the table.

    - If the interface will be used to provide only a routed connection to your ISP, skip to step **Error! Reference source not found.**.
    - If the interface will be used to provide a bridged-only connection or a bridged-and-routed connection to your ISP, then continue with step 12 to enable bridging.

12. Click the Bridging tab.

    The Bridge Configuration page displays:

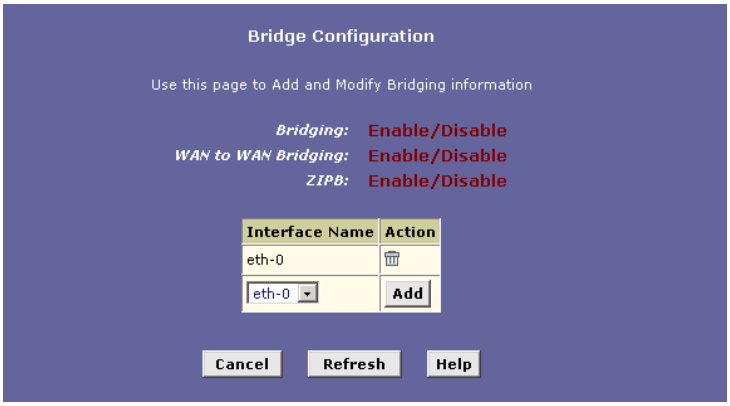



***Figure 22. Bridge Configuration Page***

The Bridge Configuration page provides links (shown in red) to the System Mode page, where you can enable or disable the corresponding bridging services. The Bridge Configuration page also displays a table for specifying the interfaces that support bridging. The table may be empty if bridging has not yet been configured.

13. In the interface table, select all interface names on which you want to perform bridging and click Add.

    To enable bridging with your ISP, select the EoA interface and the LAN interface(s) (eth-0 and/or usb-0).

    You can enable bridging on an IP-enabled EoA interface; in this case, the same interface will be capable of handling both bridged and routed data packets.

14. Click the Bridging: Enable/Disable link.

    The System Mode page displays:

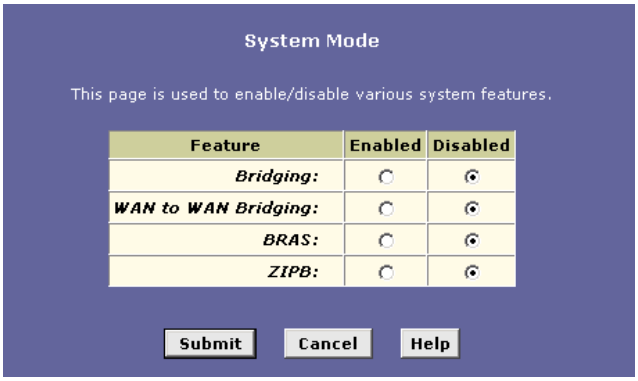



***Figure 23. System Mode Page***

    You can also access the System Mode page from the task bar in the Home tab.

15. Click the Bridging: Enabled radio button (if not already selected), and then click Submit.

    A page will briefly display to confirm your changes, and will return you to the Bridge Configuration page.

16. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

## Configuring IPoA Interfaces

An IPoA interface can be used to exchange IP packets over the ATM network, without using an underlying Ethernet over ATM (EoA) connection. Typically, this type of interface is used only in product development and test environments, to eliminate unneeded variables when evaluating IP protocol processing.

To configure an IPoA interface, log into Configuration Manager, click the WAN tab, and then click **IPoA** in the task bar. The IPoA Configuration page displays:

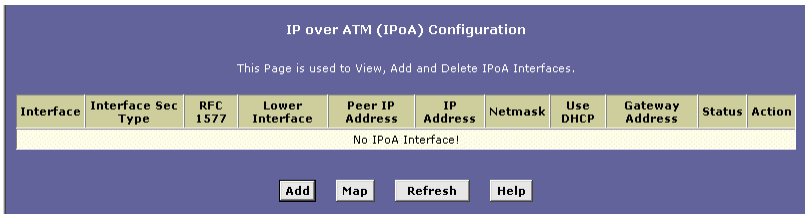



***Figure 24. IPoA Configuration Page***

The table contains a row for each IPoA interface currently defined. The table may initially be empty. The following table describes the fields on this page:

| Field | Description |
|---|---|
| *Interface* | The name the software uses to identify the IPoA interface |
| *Interface Sec Type* | The type of security protections in effect on the interface (public, private, or DMZ):<br>○ A *public* interface connects to the Internet (IPoA interfaces are typically public). Packets received on a public interface are subject to the most restrictive set of firewall protections defined in the software.<br>○ A *private* interface connects to your LAN, such as the Ethernet interface. Packets received on a private interface are subject to a less restrictive set of protections, because they originate within the network.<br>The term *DMZ* (de-militarized zone), in Internet networking terms, refers to computers that are available for both public and in-network accesses (such as a company's public Web server). Packets incoming on a DMZ interface—whether from a LAN or external source—are subject to a level of protection that is in between those for public and private interfaces. |
| *RFC 1577* | Specifies whether the IPoA protocol to be used complies with the IEFT specification named "RFC 1577 - Classical IP and ARP over ATM" (contact your ISP if unsure). |

| Field | Description |
|---|---|
| *Lower interface* | IPoA interfaces are defined in software, and then associated with lower-level software and hardware structures (at the lowest level, they are associated with a physical port – the WAN port). This field should reflect an interface name defined in the next lower level of software over which the IPoA interface will operate. This will be an ATM VC interface, such as *aal5-0*. |
| *Peer IP Address* | The IP address of the remote computer you will be connecting to via the WAN interface. |
| *Config IP Address and Netmask* | The IP address and network mask you want to assign to the interface. If DHCP is enabled, this address serves as a request to the remote computer's DHCP server, which may assign another address. |
| *Gateway Address* | The external IP address that the ADSL/Ethernet router communicates with via the IPoA interface to gain access to the Internet. This is typically an ISP server. |
| *Status* | A green or red ball will display to indicate that the interface is currently up or down, respectively. You cannot manually enable or disable the interface; a down interface may indicate a problem with the DSL connection, or with the remote IPoA computer. |
| *Action* | Icons you can click on to edit ( ) or delete ( ) the associated IPoA interface.<br>Not all settings are available on the IPoA Interface - Modify page. To modify the other settings, you must delete the interface and create a new one. Be sure to submit and commit your changes if you make modifications. |

### Adding IPoA Interfaces

Follow these instructions to add an IPoA interface:

1. Display the IPoA page and click Add.

   The IPoA Interface – Add page displays:

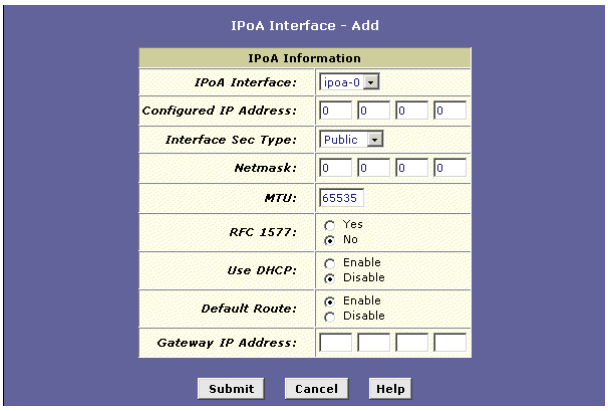



   ***Figure 25. IPoA Interface – Add Page***

2. Select the next available interface name from the IPoA Interface drop-down list.
3. In the Configured IP Address and Net Mask text boxes, type the address and mask that you want to assign to the IPoA interface.

   If you enable the DHCP option (in step 6 below), then the IP address you enter here will serve as a requested address; the DHCP server may assign another address if necessary.
4. From the Interface Sec Type drop-down list, select the level of firewall security for the interface: *Public*, *Private*, or *DMZ* (see page 70 for definitions).
5. In the RFC 1577 field, click the Yes radio button if the interface complies with the IETF specification RFC 1577 and click Add.
6. If the remote IPoA computer provides a DHCP server, you can click the Enable radio button in the Use DHCP field to have the IP address dynamically assigned from the server.
7. If you want the IPoA interface to serve as the default route for your LAN, click the Enable radio button in the Default Route field.

   Only one WAN interface can be selected as the default route.
8. In the Gateway IP Address field, enter the address of the Internet computer to contact to gain initial access to the Internet.
9. Click Submit.

   A confirmation page will display to confirm your changes.

10. Click Close to return to the IPoA page and view the new interface in the table.

IPoA interfaces must be mapped to a lower ATM VC interface before they can be used. Follow these instructions to map and IPoA interface to an ATM VC:

11. In the IPoA interface table, click Map in the row corresponding to the IPoA interface you want to map.

    The IPoA Map Information page displays:

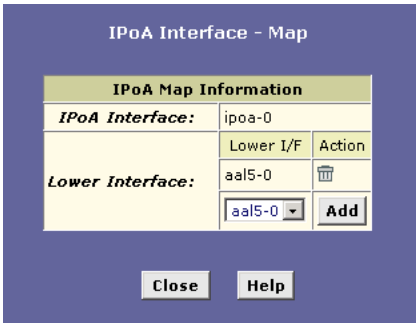



***Figure 26. IPoA Interface – Map Page***

12. From the Lower Interface drop-down list, select the ATM VC interface you want to map the IPoA interface to, and then click Add.

13. Click Close to return to the IPoA Configuration page.

14. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

To view all IPoA-to-ATM VC interface mappings, click Map at the bottom of the IPoA Configuration page (not in the table). The IPoA Interface – Global Map displays:

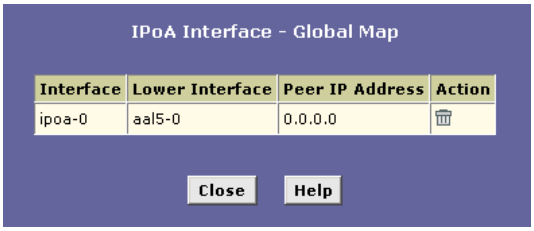



***Figure 27. IPoA Interface – Global Map Page***

You can click in the Action column to delete an IPoA mapping. The IPoA interface itself is not deleted.

# 6 Configuring the System Operating Modes

The Hurricane 9200/S can operate as a router, a bridge, or both. The system operating mode is determined by how you configure the LAN and WAN interfaces to exchange data within your network and with your ISP. This chapter provides an overview of how routers and bridges work, and explains how to configure the device interfaces and other settings to meet the needs of your network and ISP connection type.

## Overview of Bridges and Routers

Both bridges and routers enable communication between two networks, such as a home network and ISP's network of Internet access servers. Although to an end-user they may appear to provide the same functionality, bridges and routers operate differently and provide different services. Some ISPs require their customers to use a bridge connection, whereas others allow a routed connection.

### How Bridges Work

Bridges enable computers on two networks to communicate as if they are on two segments of the same physical LAN. A bridge learns the hardware IDs of all computers on each network it is attached to. (These hardware IDs are assigned by manufacturers to devices such as network interface cards that enable computers to connect to networks.) The bridge determines which hardware IDs are connected on each side of the bridge, and stores these associations in its *bridge forwarding table*.

For example, when the Hurricane 9200/S is acting as a bridge, it learns to associate the hardware IDs of each of your LAN computers with its LAN interface (e.g., eth-0 or usb-0), and the hardware IDs of your ISP's access server(s) with its WAN interface (e.g., eoa-0).

When the bridge receives a data packet, the bridge compares the packet's destination hardware ID to the entries in its bridge forwarding table. When the packet's destination ID matches one of the entries, it forwards the packet through the associated interface, where the computer with the matching hardware ID can claim the packet. When the bridge does not recognize a packet's destination hardware ID, it broadcasts the packet through all of its interfaces – to each network it is attached to.

Hardware IDs are also referred to as *Media Access Control* (MAC) addresses. Ethernet is a commonly used "MAC-layer" network protocol. Bridges provide a simple way to allow two or more Ethernet-based networks to share data, without requiring additional internetworking protocols. Bridges generally cannot link networks that use different MAC-layer protocols.

### How Routers Work

Routers use a higher-layer protocol than bridges use to determine how to pass data between two networks. Routers such as the Hurricane 9200/S operate based on the Internet Protocol and use IP addresses to identify where to send data.

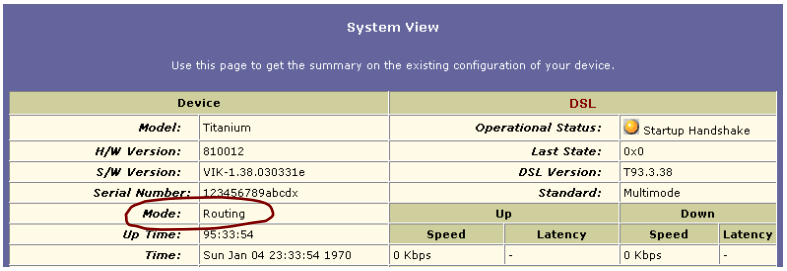
Unlike a MAC address, an IP address is not permanently associated with a particular piece of hardware, but is assigned to a computer by its user (or by an administrator or an automated mechanism called DHCP). Within a group of networked computers, a router can associate each PC's assigned IP address with its MAC address. When a PC initiates communication through the router outside the network, the router sends out IP packets to the Internet on behalf of the PC, revealing only the PC's IP address. As IP packets are received in response, the router reconciles the IP address with the PCs MAC address and sends Ethernet (MAC-layer) packets on the network for the PC to claim.

Because they use a standardized higher-layer protocol for inter-network communication, routers can connect two or more networks even when their underlying MAC-layer protocols differ. Routers are considered more intelligent and flexible devices than bridges, and often provide a variety of security and network administration services based on the IP protocols.

For a more detailed description of how routers pass data, see Chapter 10.

## Overview of System Operating Modes

The Hurricane 9200/S can operate in Bridging mode, Routing mode, or Routing and Bridging mode. You can view the currently configured mode in the System View table on the Home page, as shown in Figure 28.



System View

Use this page to get the summary on the existing configuration of your device.

| Device | | DSL | | | |
|---|---|---|---|---|---|
| Model: | Titanium | Operational Status: | Startup Handshake | | |
| H/W Version: | 810012 | Last State: | 0x0 | | |
| S/W Version: | VIK-1.38.030331e | DSL Version: | T93.3.38 | | |
| Serial Number: | 123456789abcdx | Standard: | Multimode | | |
| Mode: | Routing | Up | | Down | |
| Up Time: | 95:33:54 | Speed | Latency | Speed | Latency |
| Time: | Sun Jan 04 23:33:54 1970 | 0 Kbps | - | 0 Kbps | - |

***Figure 28. Viewing the Operating Mode***

Home | LAN | WAN | Bridging | Routing | Services | Admin

Home | System Mode | Quick Configuration

System View

Use this page to get the summary on the existing configuration of your device.

| Device | | DSL | | | |
|---|---|---|---|---|---|
| Model: | Vulcan | Operational Status: | Startup Handshake | | |
| H/W Version: | 810100 | Last State: | 0x0 | | |
| S/W Version: | VUL-2.5.050715a | DSL Version: | E.21.1.15 | | |
| Serial Number: | 123456789abcdx | Annex Type: | ADSL2 | | |
| Mode: | Routing And Bridging | Standard: | ADSL2+ | | |
| Up Time: | 19:21:5 | Connected Standard: | ADSL2+ | | |
| Time: | Thu Jan 01 19:21:05 1970 | Data Boost: | - | | |
| Time Zone: | GMT | Profile: | Main | | |
| Daylight Saving Time: | OFF | Up | | Down | |
| Name: | | Speed | Latency | Speed | Latency |
| Domain Name: | | 0 Kbps | - | 0 Kbps | - |

WAN Interfaces

| Interface | Encapsulation | IP Address | Mask | Gateway | Lower Interface | VPI/VCI | Status |
|---|---|---|---|---|---|---|---|
| ppp-0 | PPPoE | 0.0.0.0 | 0.0.0.0 | 0.0.0.0 | aal5-0 | 0/35 | |

LAN Interface

| Interface | Mac Address | IP Address | Mask | Lower Interface | Speed | Duplex | Status |
|---|---|---|---|---|---|---|---|
| eth-0 | 00:85:A0:01:01:00 | 10.10.10.2 | 255.255.255.0 | - | 100BT | Full | |
| usb-0 | - | 192.168.1.2 | 255.255.255.0 | - | - | - | |

Services Summary

| Interface | NAT | IP Filter | RIP | DHCP Relay | DHCP Client | DHCP Server | IGMP |
|---|---|---|---|---|---|---|---|
| eth-0 | ✓ inside | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ |
| ppp-0 | ✓ outside | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| usb-0 | ✓ inside | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ |

Modify | Refresh | Help

Copyright © 2001-2004 Conexant Systems, Inc. All rights reserved.

***Figure 29. Viewing the Operating Mode***

The system mode that displays *is not* configured using a single setting. Rather, it is determined at system startup based on whether the device's LAN and WAN interfaces are configured with IP information (i.e., are "IP-enabled"), and whether the Bridging setting on the System Mode page is enabled or disabled. The System

Mode page is located in the Home tab and is shown in Figure 31 on page 80.

- When the Bridging setting on the System Mode page is disabled, then the system mode will display as “Routing.”
- When the Bridging setting is enabled and at least one LAN or WAN interface is IP-enabled, then the system mode will display as “Routing and Bridging.”
- When the Bridging setting is enabled and no interfaces are IP enabled, then the device is considered to be in Bridging Mode. Note, however, that in this case you would not be able to access Configuration Manager; without being IP-enabled, the Ethernet interface could not communicate using the Internet protocol *HTTP* which is used to display information in your Web browser.

Instead of focusing on selecting a system mode of operation, users should ensure that the appropriate settings are in place to enable communication with the ISP and to provide the required LAN services. The correct operating mode will be selected automatically when these settings are properly configured.

The following sections describe how to configure IP-enabled and bridge-enabled interfaces and how to enable/disable the Bridging setting. Several common configurations are described on pages 81-83.

## Configuring Routable and Bridgeable Interfaces

### Making Interfaces Routable (IP-Enabled)

A routable or IP-enabled interface is simply one that has been assigned an IP address. IP-enabled interfaces are capable of forwarding IP packets. You can assign IP addresses to any LAN or WAN interface.

- For information about assigning IP information to LAN interfaces (e.g., eth-0 and usb-0), see Chapter 4.
- For information about assigning IP information to WAN interfaces, see Chapter 5.

### Making Interfaces Bridgeable (Bridge-Enabled)

When you make an interface bridgeable, you enable the software to receive Ethernet packets through that interface, for forwarding through the device's other bridgeable interfaces. If an interface is not bridgeable, it can only forward IP packets (assuming the interface has been IP-enabled).

**Note**

*If you create a LAN or WAN interface, it must be IP-enabled, bridge enabled, or both. An interface that has no IP address and is not made bridgeable will not pass any data.*

Follow these instructions to specify which interfaces can perform bridging.

1. Lon into Configuration Manager and click the Bridging tab.

   The Bridge Configuration page displays:

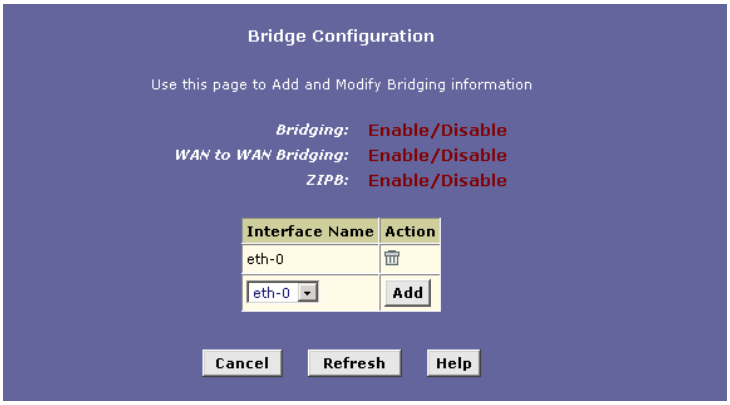



***Figure 30. Bridge Configuration Page***

The Bridge Configuration page provides links (shown in red) to the System Mode page, where you can enable or disable the corresponding bridging services. The Bridge Configuration page also displays a table for specifying the interfaces that support bridging. The table may be empty if bridging has not yet been configured.

2. In the interface table, select all interface names on which you want to perform bridging and click Add.

   To enable bridging with your ISP, select the LAN interface (eth-0 and/or usb-0) and the EoA interface you created for the bridging path.

After creating bridgeable interfaces, you must enable the bridging feature, as described in the following section, "Enabling Bridging Mode."

To make an interface non-bridgeable, display the Bridge Configuration page and click next to the interface you want to delete. Click OK to confirm the deletion. The interface remains defined in the system, but is no longer capable of performing bridging.

### Enabling Bridging Mode

After you have created bridgeable interfaces, you must enable the bridging service on the system as a whole.

1. Click the Home tab, and then click **System Mode** in the task bar.

   The System Mode page displays.

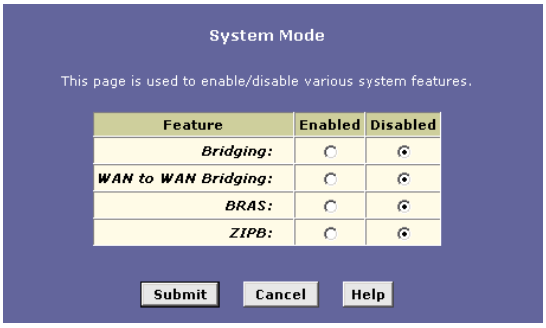



***Figure 31. System Mode Page***

   You can also access the System Mode page from Bridging page. Click any of the links that display in red near the top of the page.

2. Click the Bridging: Enabled radio button (if not already selected), and then click Submit.

   A page will briefly display to confirm your changes, and will return you to the System Mode page.

3. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

The other features shown on the System Mode page are described in "Configuring Special Bridging Features" on page on page 84.

## Common Scenarios

The sections that follow describe common system configurations that use bridging, routing, or both.

Note that you can also configure several special operating modes. These are described in "Configuring Special Bridging Features" on page 84.

### Scenario 1: Routed Connection to ISP

In this scenario, the ISP requires customers to have a routed connection to their access server. For a routed connection, the LAN and WAN interfaces must be IP-enabled. No bridging services need to be enabled. This configuration would have these features:

- An Ethernet (and/or USB) interface with an IP address and network mask that identify it as being in the same subnet as your LAN PCs. See Chapter 4 for instructions.
- An IP-enabled WAN interface. The interface type can be PPP or EoA. An IPoA interface can also be used, but they are rarely used in customer settings. See Chapter 5 for instructions.
  - If an EoA interfaces is created, an IP address should be assigned to it. Or, the interface should be configured to receive an IP address through DHCP.
  - For PPP interfaces, IP information is assigned when the link is negotiated.
  - For either type of WAN interface, the Default Gateway check box is normally selected.
- Each PC's IP properties specify the ADSL/Ethernet router's LAN interface as its gateway IP address. The PCs may also be configured to obtain IP information automatically from a DHCP server.

With this configuration, all IP packets originating from your LAN and destined for the Internet will be routed to the PCs' default gateway (the LAN interface), then to the Hurricane 9200/S's default gateway (the WAN interface), and then to the WAN interface's gateway (the ISP's access server).

In the System View page in the Home tab, the Mode field will reflect *Routing*. With no bridging services enabled, non-IP packets will be ignored.

### Scenario 2: Bridged Connection to ISP

In this configuration, your ISP requires you to configure a bridged Internet connection. For a bridged internet connection, the WAN interface must be bridge-enabled. The configuration would have these features:

- A bridge-enabled EoA WAN interface. Bridged IP connections must use an EoA-type WAN interface. An IP address may or may not be specified for the interface.

  Note that even when the device communicates with your ISP as a bridge, its Ethernet interface must remain IP-enabled to allow you access to the Configuration Manager program through your Web browser. The Hurricane 9200/S can also continue to provide certain IP-based services to your LAN such as DHCP server and DNS relay.

- Both the LAN (eth-0 and/or usb-0) and the WAN interfaces (eoa-0) are enabled for bridging. See "Making Interfaces Bridgeable (Bridge-Enabled)" on page 78.
- The bridging service is enabled. See "Enabling Bridging Mode" on page 80.
- The ISP should provide setup instructions for the LAN PC(s), which may involve installing software to enable logging in to their servers (called a "PPPoE client"). The PC's gateway IP address should be configured as the IP address of the ISPs access server.

In the System View page in the Home tab, the Mode field will reflect *Routing and Bridging*. Although you are exclusively using a bridging connection to your ISP, the device recognizes at least one IP-enabled interface (eth-0), and therefore regards the device as capable of both routing and bridging.

### Scenario 3: Routed and Bridged Connections to ISP

In this configuration, the LAN is like that described in Scenario 1, but also includes PCs that use a bridged Internet connection. You would then need to establish bridging services in addition to routing. This would also be necessary if the LAN contains PCs that use non-IP networking protocols, such has AppleTalk or IPX. This configuration would have these features:

- An Ethernet (and/or USB) interface with an IP address and network mask that identify it as being in the same subnet as the LAN PCs. See Chapter 4 for instructions.
- An WAN interface for the routing path. This can be a PPP or EoA interface and must be IP-enabled, as described in Scenario 1.
- A WAN interface for the bridging path. This must be an EoA interface. If an EoA interface was created for the routing path, the bridging path may be able to use the same interface. Check with your ISP.
- Bridging is enabled on the LAN interface (eth-0 and/or usb-0) and on the EoA interface to be used for the bridging path. If separate interfaces are created for the bridging and routing paths, then enable bridging only on the EoA interface to be used for bridging. See “Making Interfaces Bridgeable (Bridge-Enabled)” on page 78.
- The bridging service is enabled. See “Enabling Bridging Mode” on page 80.
- For the PCs that will use the routing path, the LAN interface's IP address should be specified as the IP gateway, whether assigned statically or dynamically from a DHCP server.
- For the PCs that will use the bridging path, the ISP should provide setup instructions for the LAN PC(s), which may involve installing software to enable logging in to their servers (called a "PPPoE client"). The PC's gateway IP address should be configured as the IP address of the ISPs access server.

In the System View page in the Home tab, the Mode field will reflect you the Mode field will now reflect *Routing and Bridging*.

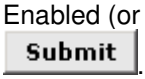
## Configuring Special Bridging Features

### Configuring WAN-to-WAN Bridging

WAN-to-WAN bridging refers to the bridging of data between WAN interfaces. This can occur only when bridging is enabled on the device and it has two or more WAN interfaces. With WAN-to-WAN bridging enabled, if a packet with an unknown destination address is received from a WAN interface, that packet is forwarded to all the other ports — including the other bridge-enabled WAN interface(s).

This ability may not, however, be desirable for all users, due to security concerns and bandwidth constraints. If this is the case, WAN-to-WAN bridging should be disabled.

Follow this procedure to enable or disable WAN-to-WAN bridging:

1. Click the Bridging tab.
2. In the interface table, select all WAN interfaces and any others on which you want to perform bridging and click .
3. Click the WAN-to-WAN bridging: Enable/Disable link.
4. On the System Mode Page, click the WAN-to-WAN Bridging: Enabled (or Disabled) radio button, and then click  .

   A page will display briefly to confirm your changes, and will return you to the Bridge Configuration page.
5. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

### Configuring Bridge/Router AutoSense (BRAS) Mode

In Bridge-Router AutoSense (BRAS) mode, the Hurricane 9200/S chooses at startup whether to operate in Routing and Bridging mode or in Bridging-only mode, based on information it learns while communicating with the LAN PCs. This capability allows units to be delivered to customers with one preconfiguration for both deployment types.

If BRAS is to be used, the modem must be preconfigured with both PPPoE and EoA interfaces, and bridging must be enabled. When the modem is booted up with BRAS enabled, the mode is determined as follows:

1. The modem comes up with both bridging and routing enabled, with its own internal PPPoE client active.
2. If the modem subsequently detects PPPoE traffic from the LAN PC's PPPoE client (indicating a bridge deployment), then the modem automatically switches to bridging mode by stopping its own PPPoE client, causing PPPoE packets to be bridged from the LAN side.
3. Otherwise (no PPPoE traffic is detected) the modem continues to operate as before in bridging mode (non-PPPoE traffic) as well as routing mode.

Follow these instructions to enable Bridge-Router AutoSense:

1. Ensure that both a PPPoE and an EoA interface is established and that the EoA interface has been made bridgeable (see “Making Interfaces Bridgeable (Bridge-Enabled)” on page 78).
2. Click the Home tab to display the Home page, then select **System Mode** in the task bar.
3. Ensure that the Bridging: Enabled radio button is selected.
4. Click the BRAS: Enabled radio button, and then click Submit.

   A page displays briefly to confirm the change, and the System Mode page redisplays.
5. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

Enabling or disabling BRAS takes effect immediately; i.e., a system reboot is *not* required.

### Configuring ZIPB Mode

The Hurricane 9200/S offers a special type of bridging mode called ZIPB (Zero Installation PPP Bridge) mode. This mode enables the ISP to simplify the installation process for customers who will be using the device as a bridge. ZIPB mode also allows customers to use the embedded firewall features, which are normally not available on bridged connections.

**Note**

*Contact your ISP to determine if they offer this connection type before you configure it.*

With ordinary DSL modems that use a bridged connection to the ISP, the customer must install a program on their PC called a PPP client. This program enables the customer to log in to the ISP's access server and acquire IP information that the computer needs for all subsequent Internet communication. In ZIPB mode, the Hurricane 9200/S uses its own PPP software to communicate at startup with the ISP. The ISP assigns the IP information to the device's PPP interface, which then uses its DHCP server to pass the information on to the user's PC. Therefore, the PPP interface and the user's PC both use the same IP address.

Working with your ISP, follow this procedure to enable ZIPB mode:

1. Ensure that your PCs are configured to accept IP information assigned by a DHCP server. See "Quick Start Part 2 — Configuring Your Computers," for instructions.
2. Ensure that at least one PPPoE or PPPoA interface has been created on the Hurricane 9200/S. See Chapter 5 for instructions.

   The Status field for the PPP interface must be set to *Start on Data*. You can modify an existing interface to set this property.

**Note**

*If you have more than one computer on your LAN and your ISP provides multiple public IP addresses for those computers, you must establish a PPP interface for each public IP address.*

3. If it does not already exist, create a DHCP server pool with poolid=0.

   The pool should include at least one unique private IP address for each computer on your LAN. The gateway IP address should be set to the address of the LAN interface, which must be in the same subnet (see Chapter 4 for instructions).
4. Enable DHCP server, as described in "Setting the DHCP Mode" on page 101.
5. Click the Services tab to display the NAT Configuration page. If the NAT feature is enabled, click the Disable radio button.
6. Click the Bridging tab to display the Bridging page, and then click the ZIPB: Enable radio button.
7. Click the Bridging: Disable radio button.

8. Click **Submit**.

   A page displays briefly to confirm the change, and the System Mode page redisplays.

9. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

# *Part 3*

## *Routing and IP-Related Features*

# About Part 3

Part 3 explains how to view information relating to Internet Protocol processing, and describes configuring the Hurricane 9200/S's IP routing features.

Part 3 contains the following chapters:

- **Chapter 7, "Viewing System IP Addresses and IP Performance Statistics,"** shows how to view the IP information associated with the device interfaces and statistics related to IP packet processing.
- **Chapter 8, "Configuring Dynamic Host Configuration Protocol,"** describes how to configure the Hurricane 9200/S's DHCP server and DHCP relay agent to dynamically assign IP information to your LAN PCs.
- **Chapter 9, "Configuring DNS Server Addresses,"** describes how to specify the IP addresses for the Domain Name Servers that your LAN will use when accessing the Internet.
- **Chapter 10, "Configuring IP Routes,"** describes how to create rules that specify the device interfaces through which data packets should be forwarded, based on their destination IP addresses.
- **Chapter 11, "Configuring the Routing Information Protocol,"** explains how to configure a protocol that enables the Hurricane 9200/S to share its routing information with other routers on your LAN or the Internet.

# 7 Viewing System IP Addresses and IP Performance Statistics

The interfaces on the Hurricane 9200/S that communicate with other network and Internet devices are identified by unique Internet protocol (IP) addresses. You can use the Configuration Manager to view the list of IP addresses that your device uses, and to view other system and network performance data.

See Appendix A for a description of IP addresses and masks.

## Viewing the Hurricane 9200/S's IP Addresses

To view the Hurricane 9200/S's IP addresses, click the Routing tab, and then click **IP Addr** in the task bar. The IP Address Table page displays:

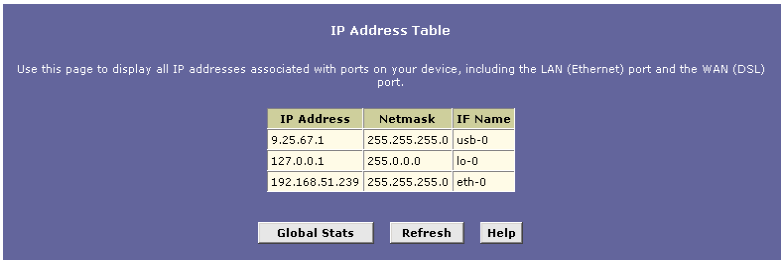



***Figure 32. IP Address Table Page***

The table lists the IP addresses, network masks ("Net Mask"), and interface names ("IF Name") for each of its IP-enabled interfaces.

The listed IP addresses may include:

- The IP address of the device's LAN (Ethernet) port, called *eth-0*. See Chapter 4 for instructions on configuring this address.
- The IP address of the device's USB interface, named *usb-0*. See Chapter 4 for instructions on configuring this address.
- The IP address of the WAN (ADSL line) interface, which your ISP and other external devices use to identify your network. It may be identified in the Configuration Manager by the names *ppp-0*, *eoa-0*, or *ipoa-0*, depending on the protocol your device uses to communicate with your ISP. Your ISP may assign the same address each time, or it may change each time you reconnect.
- The "loopback" IP address, named *lo-0*, of 127.0.0.1. This special address enables the device to keep any data addressed directly to it, rather than route the data through the default interfaces.

If your device has additional IP-enabled interfaces, the IP addresses of these will also display.

## Viewing IP Performance Statistics

You can view statistics on the processing of Internet protocol packets (a packet is a collection of data that has been bundled for transmission). You will not typically need to view this data, but you may find it helpful when working with your ISP to diagnose network and Internet data transmission problems.

To view global IP statistics, click Global Stats on the IP Address Table page. Figure 33 shows the IP Global Statistics page:

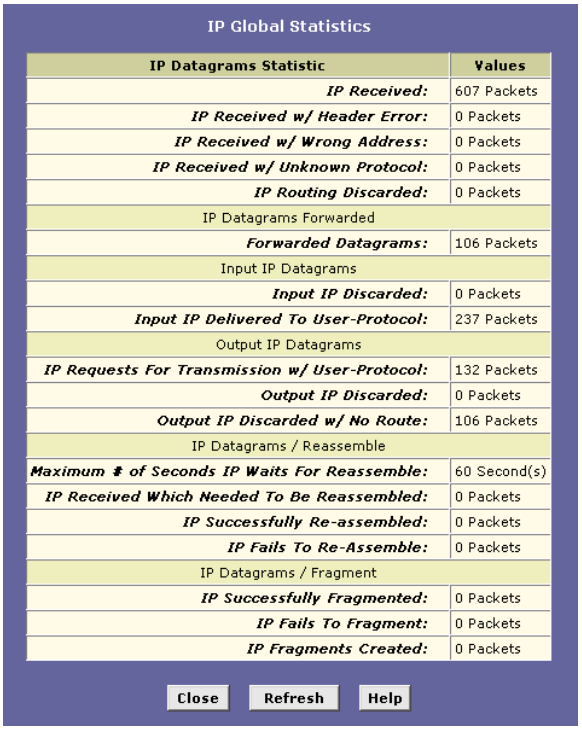

IP Global Statistics
IP Datagrams Statistic
Values
IP Received: 607 Packets
IP Received w/ Header Error: 0 Packets
IP Received w/ Wrong Address: 0 Packets
IP Received w/ Unknown Protocol: 0 Packets
IP Routing Discarded: 0 Packets
IP Datagrams Forwarded
Forwarded Datagrams: 106 Packets
Input IP Datagrams
Input IP Discarded: 0 Packets
Input IP Delivered To User-Protocol: 237 Packets
Output IP Datagrams
IP Requests For Transmission w/ User-Protocol: 132 Packets
Output IP Discarded: 0 Packets
Output IP Discarded w/ No Route: 106 Packets
IP Datagrams / Reassemble
Maximum # of Seconds IP Waits For Reassemble: 60 Second(s)
IP Received Which Needed To Be Reassembled: 0 Packets
IP Successfully Re-assembled: 0 Packets
IP Fails To Re-Assemble: 0 Packets
IP Datagrams / Fragment
IP Successfully Fragmented: 0 Packets
IP Fails To Fragment: 0 Packets
IP Fragments Created: 0 Packets
Close
Refresh
Help

***Figure 33. IP Global Statistics Page***

To display updated statistics showing any new data since you opened the page, click Refresh.

# 8 Configuring Dynamic Host Configuration Protocol

You can configure your network and Hurricane 9200/S to use the Dynamic Host Configuration Protocol (DHCP). This chapter provides an overview of DHCP and instructions for implementing it on your network.

## Overview of DHCP

### What is DHCP?

DHCP is a protocol that enables network administrators to centrally manage the assignment and distribution of IP information to computers on a network.

When you enable DHCP on a network, you allow a device — such as the Hurricane 9200/S or a router located with your ISP — to assign temporary IP addresses to your computers whenever they connect to your network. The assigning device is called a *DHCP server*, and the receiving device is a *DHCP client*.

**Note**

*If you followed the Quick Start instructions, you either configured each LAN PC with an IP address, or you specified that it will receive IP information dynamically (automatically). If you chose to have the information assigned dynamically, then you configured your PCs as DHCP clients that will accept IP addresses assigned from a DCHP server such as the Hurricane 9200/S.*

The DHCP server draws from a defined pool of IP addresses and "leases" them for a specified amount of time to your computers when they log onto the network. It monitors, collects, and redistributes the addresses as needed.

On a DHCP-enabled network, the IP information is assigned *dynamically* rather than *statically*. A DHCP client can be assigned a different address from the pool each time it reconnects to the network.

### Why use DHCP?

DHCP allows you to manage and distribute IP addresses throughout your network from a central computer. Without DHCP, you would have to configure each computer separately with IP addresses and related information. DHCP is commonly used with large networks and those that are frequently expanded or otherwise updated.

### Hurricane 9200/S DHCP modes

The device can be configured as a DHCP server, relay agent or client.

- If you configure the device as a DHCP server, it will maintain the pool of addresses and distribute them to your LAN computers. If the pool of addresses includes private IP addresses, you must also configure the Network Address Translation service, so that the private addresses can be translated to your public IP address on the Internet.
- If your ISP performs the DCHP server function for your network, then you can configure the device as a DHCP relay agent. When a computer logs onto the network, the Hurricane 9200/S contacts the ISP for the necessary IP information, which it relays back to the computer.
- If you have another PC or device on your network already performing the DHCP server function, then you can configure the device's LAN interface to be a DHCP client of that server (as are your PCs). This configuration is described in Chapter 4.

**Note**

*You can input settings for both DHCP server and DHCP relay mode, and then activate either mode at any time. Deactivated settings are retained for your future use.*

## Configuring DHCP Server

**Note**

*Before you begin, be sure to configure your PCs to accept DHCP information assigned by a DHCP server. See "Quick Start Part 2 — Configuring Your Computers," for instructions.*

To set up DHCP server, you first define the ranges of IP addresses that you want to be distributed to your PCs, called DHCP server address pools.

### Guidelines for creating DHCP server address pools

An IP address pool typically includes a range private addresses that you define. LAN administrators often define private IP addresses for use only on their networks. See "Overview of NAT" on page 117 for an explanation of private IP addresses. You can also use DHCP server pools to distribute multiple public IP addresses, if, for example, these are to be shared among a larger set of LAN computers.

You can create up to two DHCP server address pools. You can define a single pool with addresses that can be assigned to your LAN PCs (connected via the Ethernet port) and to a USB-connected computer, as long you have assigned to the USB and Ethernet interfaces static IP addresses that place them in the same subnet. See Appendix A for an explanation of subnets.

For example, assume you assigned the following addresses to the Ethernet and USB interfaces:

**Ethernet interface (eth-0)**: IP address 192.168.1.1
mask 255.255.255.0

**USB interface (usb-0)**: IP address 192.168.1.2
mask 255.255.255.0

Then you could create a single pool for assignment to all your PCs:

**Pool 0**: 192.168.1.3 through 192.168.1.20
mask 255.255.255.0

You can create a second pool – which must be in a different subnet than the first – if either of these circumstances apply:

- You assigned static IP addresses to the device's Ethernet and USB interfaces that place them in different subnets (note that this is not required).
- Your LAN configuration includes two subnets. For example, the following pool can be created to distribute IP addresses over the Wireless LAN interface, which is assigned IP address 192.168.**2**.1 by default (i.e., the interface is in a different subnet than the Ethernet and USB interfaces):

  **Pool 1**: 192.168.2.2 through 192.168.2.10
  mask 255.255.255.0

The DHCP server distributes addresses to computers connected to one of its interfaces only when that interface is in the same subnet as the pool addresses. In the examples shown above, the IP addresses in pool 0 would be assigned only over the Ethernet and USB interfaces, and the addresses in pool 1 would only be assigned only over the Wireless LAN interface.

### Adding DHCP Server Address Pools

Follow these instructions to create an IP address pool:

1. Log into Configuration Manager, click the LAN tab, and then click **DHCP Server** in the task bar.

   The DHCP Server Configuration page displays:

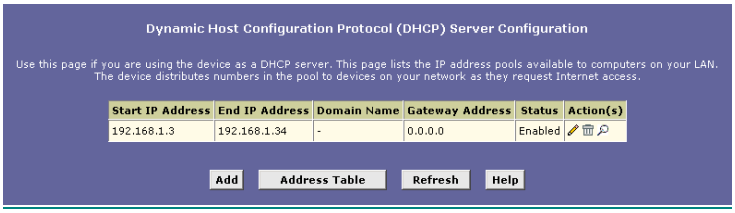

Dynamic Host Configuration Protocol (DHCP) Server Configuration
Use this page if you are using the device as a DHCP server. This page lists the IP address pools available to computers on your LAN. The device distributes numbers in the pool to devices on your network as they request Internet access.
Start IP Address
End IP Address
Domain Name
Gateway Address
Status
Action(s)
192.168.1.3
192.168.1.34
-
0.0.0.0
Enabled
Add
Address Table
Refresh
Help

***Figure 34. DHCP Configuration Page***

   Depending on your preconfigured settings, the table may display up to two address pools, each in a row, or may be empty.

2. Click **Add**.

   The DHCP Server Pool – Add page displays:

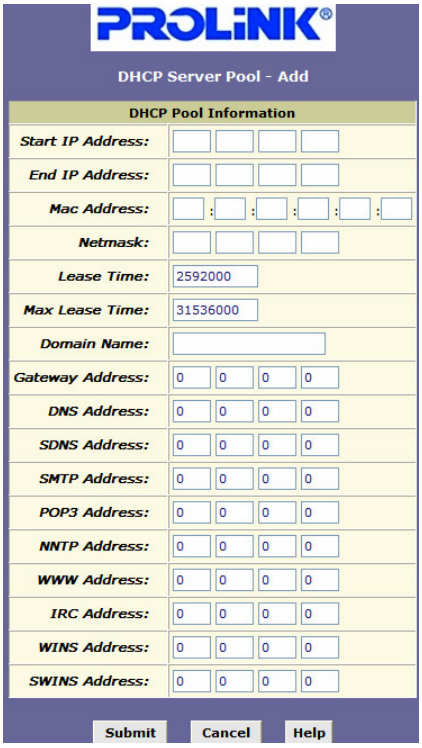



***Figure 35. DHCP Server Pool – Add Page***

3. Enter values for the *Start IP Address*, *End IP Address*, and *Net Mask* fields, which are required, and any others as needed:

| Field | Description |
|---|---|
| *Start/End IP Addresses* | Specifies the lowest and highest addresses in the pool, up to a maximum range of 254 addresses. For example, if the LAN interface is assigned IP address 192.168.1.1, then you could create a pool with address range 192.168.1.2 – 192.168.1.254 for distribution to your LAN computers. |
| *Mac Address* | A MAC address is a manufacturer-assigned hardware ID that is unique for each device on a network. Use this field only if you want to assign a specific IP address to the computer that uses this MAC address. If you type a MAC address here, you must have specified the same IP address in both the Start IP Address and End IP Address fields. |
| *Lease Time* | This specifies the lease period for which the server assigns an IP address to a client in case the client does not request for a specific lease period itself. |
| *Max Lease Time* | This specifies the maximum period for which the DHCP server can lease out an IP address to a DHCP client. |
| *Net Mask* | Specifies which portion of each IP address in this range refers to the network and which portion refers to the host (computer). For a description of network masks and LAN network masks, see Appendix A. You can use the network mask to distinguish which pool of addresses should be distributed to a particular subnet (as explained on page 95). |
| *Domain Name* | A user-friendly name that refers to the subnet that includes the addresses in this pool. This is used for reference only. |
| *Gateway Address* | The address of the default gateway for computers that receive IP addresses from this pool. If no value is specified, then the appropriate LAN (eth-0) or USB (usb-0) port address on the device will be distributed to each PC as its gateway address, depending on how each is connected.<br>See “Hops and gateways” on page 107 for an explanation of gateway addresses. |
| *DNS/SDNS Address* | The IP address of the Domain Name System server and Secondary Domain Name System server to be used by computers that receive IP addresses from this pool. These DNS servers translate common Internet names that you type into your web browser into their equivalent numeric IP addresses. Typically, these servers are located with your ISP. |

| Field | Description |
|---|---|
| *SMTP...SWINS (optional)* | The IP addresses of devices that perform various services for computers that receive IP addresses from this pool (such as the SMTP, or Simple Mail Transfer Protocol, server which handles e-mail traffic). Contact your ISP for these addresses. |

4. When you are done defining the pool, click Submit.

   A confirmation page displays briefly to indicate that the pool has been added successfully. After a few seconds, the DHCP Server Pool – Add page displays with the newly added pool.

5. Follow the instructions in "Setting the DHCP Mode" on page 101 to enable the DHCP Server.

### Viewing, modifying, and deleting address pools

To view, modify, or delete an existing address pool, display the DHCP Server Configuration page, and click the icons in the corresponding row in the address pool table.

- To delete an IP address pool, click , then submit and commit your changes.
- To view details on an IP address pool, click . A page displays with the same information that you entered when you added the pool.
- To modify the pool, click . The DHCP Server Pool – Modify page displays:

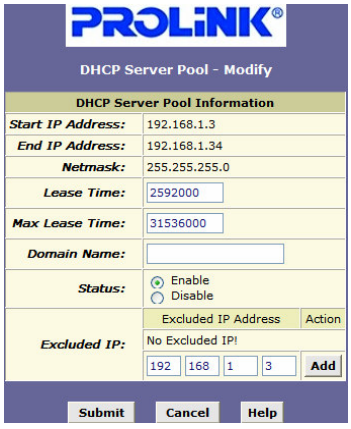



***Figure 36. DHCP Server Pool – Modify Page***

You can change the domain name associated with an IP address pool, change Lease Time, Max Lease Time or enable/disable the pool. By default, a pool is enabled when you create it.

If you want the changes to be permanent, follow the instructions on page 45 to commit them.

### Excluding IP addresses from a pool

If you have IP addresses that are designated for fixed use with specific devices, or for some other reason you do not want to make them available to your network, you can exclude them from the pool. Display the DHCP Server Pool – Modify page, as shown in Figure 36. Type each address to be excluded in the Excluded IP field, and click Add. When you are done specifying excluded addresses, click Submit, and then use the Commit function to save your changes to permanent memory (see page 45).

### Viewing current DHCP address assignments

When the Hurricane 9200/S functions as a DHCP server for your LAN, it keeps a record of any addresses currently leased to your computers. To view a table of all current IP address assignments, display the DHCP Server Configuration page, and then click Address Table.

A page displays similar to that shown in Figure 37.

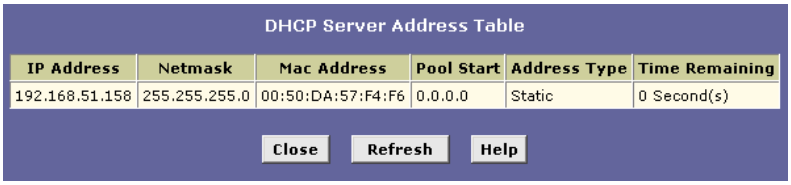



***Figure 37. DHCP Server Address Table Page***

The DHCP Server Address Table lists any IP addresses that are currently leased to your computers. For each leased address, the table lists the following information:

| Field | Description |
|---|---|
| *IP Address* | The address that has been leased from the pool. |
| *Netmask* | The network mask associated with the leased address. This identifies the network ID and host ID portions of the address (see Appendix A for an explanation of these terms). |
| *Mac Address* | The unique hardware ID of the computer to which the IP address has been assigned. |
| *Pool Start* | The lower boundary of the address pool (shown here to identify the pool from which the leased address was assigned). |
| *Address Type* | Can be *Static* or *Dynamic*. *Static* indicates that the IP number has been assigned permanently to the specific hardware device. *Dynamic* indicates that the number has been leased temporarily for a specified length of time. |
| *Time Remaining* | The amount of time left for the device to use the assigned address. The default lease time is 30 days (31536000 seconds). |

## Configuring DHCP Relay

Some ISPs perform the DHCP server function for their customers' home/small office networks. In this case, you can configure the device as a DHCP relay agent. When a computer on your network requests Internet access, the Hurricane 9200/S contacts your ISP to obtain an IP address (and other information), and then forwards that information to the computer. Follow these instructions to configure DHCP relay:

First, you must configure your PCs to accept DHCP information assigned by a DHCP server:

1. Open the Windows Control Panel and display the computer's Networking properties. Configure the TCP/IP properties to "Obtain an IP address automatically" (the actual text may vary depending on your operating system). For detailed instructions, see "Quick Start Part 2 — Configuring Your Computers," for instructions.

Next, you specify the IP address of the DHCP server and select the interfaces on your network that will be using the relay service.

2. Log into the Configuration Manager, click the LAN tab, and then click **DHCP Relay** in the task bar.

   The DHCP Relay Configuration page displays:

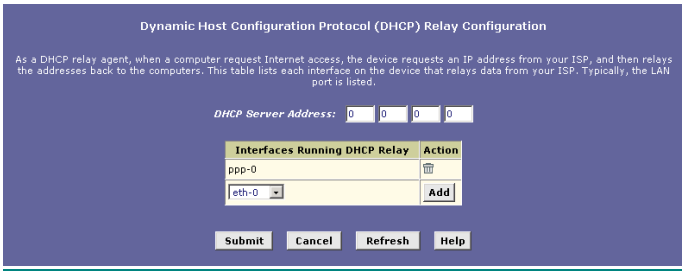

Dynamic Host Configuration Protocol (DHCP) Relay Configuration
As a DHCP relay agent, when a computer request Internet access, the device requests an IP address from your ISP, and then relays the addresses back to the computers. This table lists each interface on the device that relays data from your ISP. Typically, the LAN port is listed.
DHCP Server Address:
0 0 0 0
Interfaces Running DHCP Relay
Action
ppp-0
eth-0
Add
Submit
Cancel
Refresh
Help

***Figure 38. DHCP Relay Configuration Page***

3. In the DHCP Server Address fields, type the IP address of your ISP's DHCP server.

   If you do not have this address, it is not essential to enter it here. Requests for IP information from your LAN will be passed to the default gateway, which should route the request appropriately.

4. Select the device's WAN interface from the drop-down list and click **Add**.

   The WAN interface may be named ppp-0, eoa-0, or ipoa-0. Contact your ISP if you are unsure which type to use.

   (Note that you can also delete an interface from the table by clicking in the right column.)

5. Click Submit.

   A page displays to confirm your changes, and the program returns to the DHCP Relay Configuration page.

6. Follow the instructions in "Setting the DHCP Mode" to set the DHCP mode to *DHCP Relay*.

## Setting the DHCP Mode

You must enable the appropriate DHCP mode to activate your DHCP relay or DHCP server settings.

Follow these instructions to set the DHCP mode:

1. Click the LAN tab, and then click **DHCP Mode** in the task bar.

   The DHCP Configuration page displays:

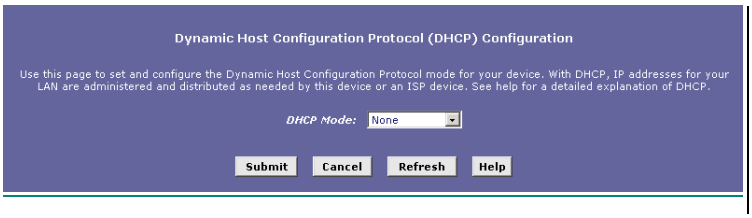

Dynamic Host Configuration Protocol (DHCP) Configuration
Use this page to set and configure the Dynamic Host Configuration Protocol mode for your device. With DHCP, IP addresses for your LAN are administered and distributed as needed by this device or an ISP device. See help for a detailed explanation of DHCP.
DHCP Mode:
None
Submit
Cancel
Refresh
Help

***Figure 39. DHCP Configuration Page***

2. From the DHCP Mode drop-down list, choose **DHCP Server**, **DHCP Relay**, or **None**.

   If you choose *none*, your LAN computers must be configured with static IP addresses.

3. Click Submit.

4. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

# 9 Configuring DNS Server Addresses

## About DNS

Domain Name System (DNS) servers map the user-friendly domain names that users type into their Web browsers (e.g., "yahoo.com") to the equivalent numerical IP addresses that are used for Internet routing.

When a PC user types a domain name into a browser, the PC must first send a request to a DNS server to obtain the equivalent IP address. The DNS server will attempt to look up the domain name in its own database, and will communicate with higher-level DNS servers when the name cannot be found locally. When the address is found, it is sent back to the requesting PC and is referenced in IP packets for the remainder of the communication.

## Assigning DNS Addresses to PCs

Multiple DNS addresses are useful to provide alternatives when one of the servers is down or is encountering heavy traffic. ISPs typically provide primary and secondary DNS addresses, and may provide additional addresses. Your LAN PCs learn these DNS addresses in one of the following ways:

- **Statically:** If your ISP provides you with their DNS server addresses, you can assign them to each PC by modifying the PCs' IP properties.
- **Dynamically from a DHCP pool:** You can configure the DHCP Server feature on the ADSL/Ethernet router and create an address pool that specifies the DNS addresses to be distributed to the PCs. Refer to “Configuring DHCP Server,” on page 95 for instructions on creating DHCP address pools.

In either case, you can specify the actual addresses of the ISP's DNS servers (on the PC or in the DHCP pool), or you can specify the address of the LAN interface on the ADSL/Ethernet router (e.g., 192.168.1.1). When you specify the LAN interface IP address, the device performs *DNS relay*, as described in the following section.

**Note**

*If you specify the actual DNS server addresses on the PCs or in the DHCP pool, the DNS relay feature is not used.*

## Configuring DNS Relay

When you specify the Hurricane 9200/S's LAN interface IP address as the DNS address, then the device automatically performs "DNS relay"; i.e., because the device itself is not a DNS server, it forwards domain name lookup requests it receives from the LAN PCs to a DNS server at the ISP. It then relays the DNS server's response to the PC.

When performing DNS relay, the Hurricane 9200/S must maintain the IP addresses of the DNS servers it contacts. It can learn these addresses in either or both of the following ways:

- **Learned through PPP:** If the device uses a PPP connection to the ISP, the primary and secondary DNS addresses can be learned via the PPP protocol. To use this method, the "Use DNS" checkbox must be selected in the PPP interface properties. (See "Configuring PPP Interfaces," on page 59 for related instructions. Note that you cannot change this property by modifying an existing PPP interface; you must delete the interface and recreate it with the new setting.)

  Using this option is advantageous in that you will not need to reconfigure the PCs or the ADSL/Ethernet router if the ISP changes their DNS addresses.

- **Configured on the ADSL/Ethernet router:** You can use the device's DNS feature to specify the ISP's DNS addresses. If the device also uses a PPP interface with the "Use DNS" property enabled, then these configured addresses can be used in addition to the two addresses learned through PPP. If "Use DNS" is not enabled, or if a protocol other than PPP is used (such as EoA), then these configured addresses will be used as the primary and secondary DNS addresses.

Follow these steps to configure DNS relay:

1. Configure the LAN PCs to use the ADSL/Ethernet router's LAN IP address as their DNS server address using either of the following methods:
   - by assigning the LAN IP address statically to each PC
   - by inputting the LAN IP address or the address *0.0.0.0* as the DNS address in the DHCP server pool used by the PCs.
2. If using a PPP connection to the ISP, click the "Use DNS" check box so that the DNS server addresses it learns are used for DNS relay.
   Or, ...
   If not using a PPP connection (or if you want to specify DNS addresses in addition to those learned through PPP), configure the DNS addresses on the ADSL/Ethernet router as follows:

a. Click the Services tab, and then click **DNS** in the task bar. The DNS Configuration page displays.

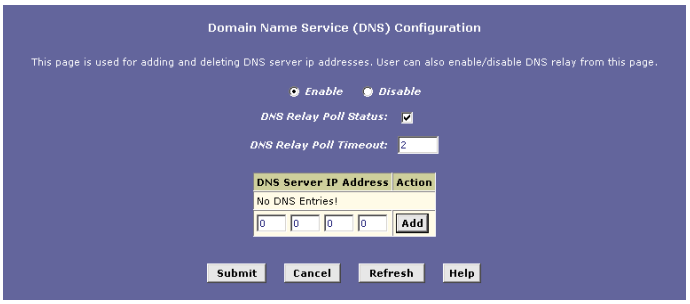



***Figure 40. DNS Configuration Page***

b. Type the IP address of the DNS server in an empty row and click **Add**.

You can enter up to two addresses.

c. Click the **DNS Relay Poll Status** check box if you want the software to send regular test messages to the DNS servers to ensure that they remain up (recommended). If none of the specified DNS servers respond (including any acquired by PPP, which do not display in the table), then an alert will display in the System Log window (see the Admin tab, System Log page).

You can specify the interval in minutes between each DNS poll message in the **DNS Relay Poll Timeout** text box.

d. Click the Enable radio button, and then click **Submit**.

3. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

**Note**

*DNS addresses that are assigned to LAN PCs prior to enabling DNS relay will remain in effect until the PC is rebooted. DNS relay will only take effect when a PC's DNS address is the LAN IP address.*

*Similarly, if after enabling DNS relay, you specify a DNS address (other than the LAN IP address) in a DHCP pool or statically on a PC, then that address will be used instead of the DNS relay address.*

# 10 Configuring IP Routes

You can use Configuration Manager to define specific routes for your Internet and network data. This chapter describes basic routing concepts and provides instructions for creating routes.

Note that most users do not need to define IP routes.

## Overview of IP Routes

The essential challenge of a router is: when it receives data intended for a particular destination, which next device should it send that data to? When you define IP routes, you provide the rules that a computer uses to make these decisions.

### IP routing versus telephone switching

IP routing decisions are similar to those made by switchboards that handle telephone calls.

When you dial a long distance telephone number, you are first connected to a switchboard operated by your local phone service carrier. All calls you initiate go first to this main switchboard.

If the phone number you dialed is outside your calling area, the switchboard opens a connection to a higher-level switchboard for long distance calls. That switchboard looks at the area code you dialed and connects you with another switchboard that serves that area. This new switchboard, in turn, may look at the prefix in the number you dialed (the middle set of three numbers) and connect to a more localized switchboard that handles numbers with that prefix. This final switchboard can then look at the last four digits of the phone number to open a connection with the person or company you dialed.

In comparison, when your computer initiates communication over the Internet, such as viewing a web page connecting to an web server, the data it sends out includes the IP address of the destination computer (the “phone number”). All your outgoing requests first go to the same router at your ISP (the first “switchboard”). That router looks at the network ID portion of the destination address (the “area code”) and determines which next router to send the request to. After several such passes, the request arrives at a router for the destination network, which then uses the host ID portion of the destination IP address (the local “phone number”) to route the request to the appropriate computer. (The network ID and host ID portions of IP addresses are explained in Appendix A.)

With both the telephone and the computer, all transactions are initially sent to the same switchboard or router, which serves as a gateway to other higher- or lower-level devices. No single device knows at the outset the eventual path the data will take, but each uses a specific part of the destination address/phone number to make a decision about which device to connect to next.

### Hops and gateways

Each time Internet data is passed from one Internet address to another, it is said to take a *hop*. A hop can be a handoff to a different port on the same device, to a different device on the same network, or to a device on an entirely different network.

When a hop passes data from one type of network to another, it uses a *gateway*. A gateway is an IP address that provides initial access to a network, just as a switchboard serves as a gateway to a specific set of phone numbers. For example, when a computer on your LAN requests access to a company's web site, your ISP serves as a gateway to the Internet. As your request reaches its destination, another gateway provides access to the company's web servers.

### Using IP routes to define default gateways

IP routes are defined on computers, routers, and other IP-enabled devices to instruct them which hop to take, or which gateway to use, to help forward data along to its specified destination.

If no IP route is defined for a destination, then IP data is passed to a predetermined *default gateway*. The default gateway serves like a higher-level telephone switchboard; it may not be able to connect directly to the destination, but it will know a set of other devices that can help pass the data intelligently. If it cannot determine which of these devices provides a good next hop (because no such route has been defined), then that device will forward the data to *its* default gateway. Eventually, a high level device, using a predefined IP route, will be able to forward the data along a path to its destination.

### Do I need to define IP routes?

Most users do not need to define IP routes. On a typical small home or office LAN, the existing routes that set up the default gateways for your LAN computers and for the Hurricane 9200/S provide the most appropriate path for all your Internet traffic.

- On your LAN computers, a default gateway directs all Internet traffic to the LAN interface on the Hurricane 9200/S. (assuming the device is configured in Routing mode). Your LAN computers know their default gateway either because you assigned it to them when you modified their TCP/IP properties, or because you configured them to receive the information dynamically from a server whenever they access the Internet. (Each of these processes is described in "Quick Start Part 2 — Configuring Your Computers.")
- On the Hurricane 9200/S itself, a default gateway is defined to direct all outbound Internet traffic to a router at your ISP. This default gateway is assigned automatically by your ISP whenever the device negotiates an Internet connection. (The process for adding a default route is described on page 110.)

You may need to define routes if your home setup includes two or more networks or subnets, if you connect to two or more ISP services, or if you connect to a remote corporate LAN.

## Viewing the IP Routing Table

All IP-enabled computers and routers maintain a table of IP addresses that are commonly accessed by their users. For each of these *destination IP addresses*, the table lists the IP address of the first hop the data should take. This table is known as the device's *routing table*.

To view the Hurricane 9200/S's routing table, click the Routing tab. The IP Route page displays by default:

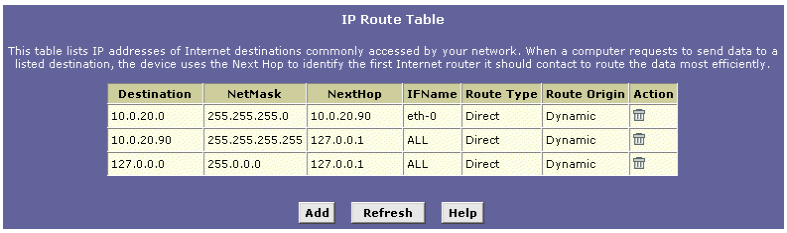



***Figure 41. IP Route Table Page***

The IP Route Table displays a row for each existing route. These include routes that were predefined on the device, routes you may have added, and routes that the device has identified automatically through communication with other devices.

The routing table should reflect a default gateway, which directs outbound Internet traffic to your ISP. This default gateway is shown in the row containing destination address 0.0.0.0.

The following table defines the fields in the IP Routing Table.

| Field | Description |
|---|---|
| *Destination* | Specifies the IP address of the destination computer. The destination can specified as the IP address of a specific computer or an entire network. It can also be specified as all zeros to indicate that this route should be used for all destinations for which no other route is defined (this is the route that creates the default gateway). |
| *Netmask* | Indicates which parts of the destination address refer to the network and which parts refer to a computer on the network. Refer to Appendix A, for an explanation of network masks. The default gateway uses a netmask of 0.0.0.0. |
| *NextHop* | Specifies the *next* IP address to send data to when its final destination is that shown in the destination column. |
| *IFName* | Displays the name of the interface on the device through which data is forwarded to the specified next hop. |
| *Route Type* | Indicates whether the route is direct or indirect. In a *direct* route, the source and destination computers are on the same network, and the router attempts to directly deliver the data to the computer. In an *indirect* route, the source and destination computers are on different networks, and the router forwards data to a device on another network for further handling. |
| *Route Origin* | Displays how the route was defined. *Dynamic* indicates that the route was created automatically or predefined by your ISP or the manufacturer. Routes you create are labeled *Local*. Other routes may be created automatically (using RIP, as described in Chapter 11), or defined remotely through various network management protocols (LCL or ICMP). |
| *Action* | Displays an icon (🗑) you can click on to delete a route. |

## Adding IP Routes

Follow these instructions to add an IP route to the routing table.

1. From the IP Route Table page, click **Add**.

   The IP Route – Add page displays:

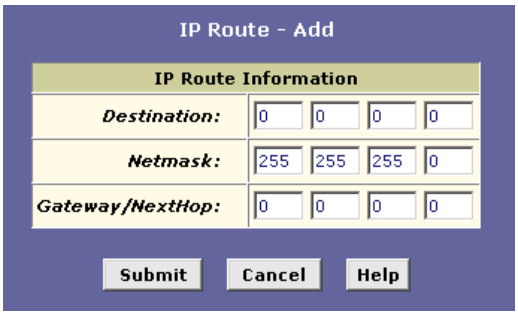



   ***Figure 42. IP Route – Add Page***

2. Specify the destination, network mask, and gateway or next hop for this route.

   For a description of these fields, refer to the table on page 109.

   To create a route that defines the default gateway for your LAN, enter *0.0.0.0* in both the Destination and Netmask fields. Enter your ISP's IP address in the Gateway/NextHop field.

   Note that you cannot specify the interface name, route type or route origin. These parameters are used only for routes that are identified automatically as the device communicates with other routing devices. For routes you create, the routing table displays system default values in these fields.

3. Click **Submit**.

4. On the confirmation page, click **Close** to return to the IP Route table.

   The IP Routing Table will now display the new route.

5. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

# 11 Configuring the Routing Information Protocol

The Hurricane 9200/S can be configured to communicate with other routing devices to determine the best path for sending data to its intended destination. Routing devices communicate this information using a variety of IP protocols. This chapter describes how to configure the Hurricane 9200/S to use one of these, called the Routing Information Protocol (RIP).

## RIP Overview

RIP is an Internet protocol you can set up to share routing table information with other routing devices on your LAN, at your ISP's location, or on remote networks connected via the ADSL line. Generally, RIP is used to enable communication on *autonomous* networks. An autonomous network is one in which all computers are administered by the same entity. An autonomous network may be a single network, or a grouping of several networks under the same administration. An example of an autonomous network is a corporate LAN, including devices that can access it from remote locations, such as the computers telecommuters use.

Using RIP, each device sends its routing table to its closest neighbor every 30 seconds. The neighboring device in turn passes the information on to its next neighbor and so on until all devices in the autonomous network have the same set of routes.

### When should you configure RIP?

Most small home or office networks do not need to use RIP; they have only one router, such as the Hurricane 9200/S, and one path to an ISP. In these cases, there is no need to share routes, because all Internet data from the network is sent to the same ISP gateway.

You may want to configure RIP if any of the following circumstances apply to your network:

- Your home network setup includes an additional router or RIP-enabled PC (other than the Hurricane 9200/S). The Hurricane 9200/S and the router will need to communicate via RIP to share their routing tables.
- Your network connects via the ADSL line to a remote network, such as a corporate network. In order for your LAN to learn the routes used within your corporate network, they should *both* be configured with RIP.
- Your ISP requests that you run RIP for communication with devices on their network.

## Configuring the Hurricane 9200/S's Interfaces with RIP

The following instructions describe how to enable RIP on the Hurricane 9200/S.

**Note**

*In order for the Hurricane 9200/S to communicate with other devices using RIP, you must also enable the other devices to use the protocol. See the product documentation for those devices.*

1. Log into the Configuration Manager, click the Services tab, and then click **RIP** in the task bar.

   The RIP Configuration page displays:

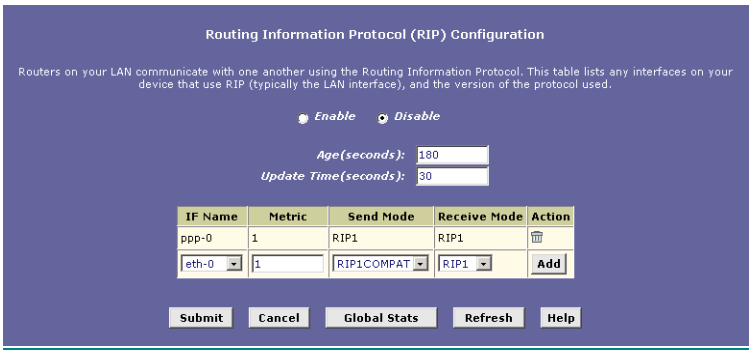



***Figure 43. RIP Configuration Page***

   The page contains radio buttons for enabling or disabling the RIP feature and a table listing interfaces on which the protocol is currently running. The first time you open this page, the table may be empty.

2. If necessary, change the Age and Update Time values.

   These are global settings for all interfaces that use RIP.

   - *Age* is the amount of time in seconds that the device's RIP table will retain each route that it learns from adjacent computers.
   - *Update Time* specifies how frequently the Hurricane 9200/S will send out its routing table to its neighbors.

3. In the IFName column, select the name of the interface on which you want to enable RIP.

   For communication with RIP-enabled devices on your LAN, select the LAN interface (usually eth-0).

   For communication with your ISP or a remote LAN, select the PPP, EoA, or other WAN interface used for that connection.

   (See page 92 for a description of various interfaces and their names.)

4. Select a metric value for the interface.

   RIP uses a "hop count" as a way to determine the best path to a given destination in the network. The hop count is the sum of

the metric values assigned to each port through which data is passed before reaching the destination. Among several alternative routes, the one with the lowest hop count is considered the fastest path.

For example, if you assign this port a metric of 1, then RIP will add 1 to the hop count when calculating a route that passes through this port. If you know that communication via this interface is slower than through other interfaces on your network, you can assign it a higher metric value than the others.

You can select any integer from 1 to 15.

5. Select a Send Mode and a Receive Mode.

   The Send Mode setting indicates the RIP version this interface will use when it sends its route information to other devices.

   The Receive Mode setting indicates the RIP version(s) in which information must be passed to the Hurricane 9200/S in order for it to be accepted into its routing table.

   RIP version 1 is the original RIP protocol. Select RIP1 if you have devices that communicate with this interface that understand RIP version 1 only.

   RIP version 2 is the preferred selection because it supports "classless" IP addresses (which are used to create subnets) and other features. Select RIP2 if all other routing devices on the autonomous network support this version of the protocol.

6. Click Add.

   The new RIP entry will display in the table.

7. Click the Enable radio button to enable the RIP feature.

**Note**

*If you disable the RIP feature, the interface settings you have configured will remain available for future activation.*

8. Click Submit.

   A page displays to confirm your changes.

9. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

**Note**

*You can delete an existing RIP entry by clicking in the Action column.*

## Viewing RIP Statistics

From the RIP Configuration page, you can click Global Stats to view statistics on attempts to send and receive route table data over RIP-enabled interfaces on the Hurricane 9200/S.

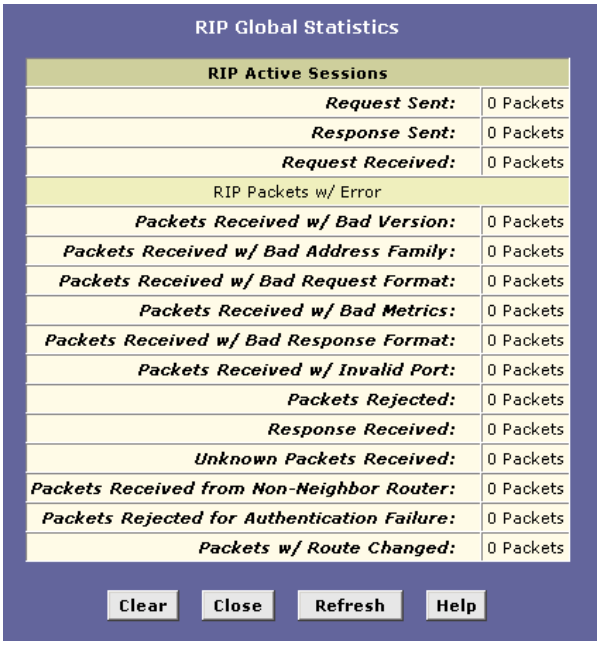

RIP Global Statistics
RIP Active Sessions
Request Sent: 0 Packets
Response Sent: 0 Packets
Request Received: 0 Packets
RIP Packets w/ Error
Packets Received w/ Bad Version: 0 Packets
Packets Received w/ Bad Address Family: 0 Packets
Packets Received w/ Bad Request Format: 0 Packets
Packets Received w/ Bad Metrics: 0 Packets
Packets Received w/ Bad Response Format: 0 Packets
Packets Received w/ Invalid Port: 0 Packets
Packets Rejected: 0 Packets
Response Received: 0 Packets
Unknown Packets Received: 0 Packets
Packets Received from Non-Neighbor Router: 0 Packets
Packets Rejected for Authentication Failure: 0 Packets
Packets w/ Route Changed: 0 Packets
Clear
Close
Refresh
Help

***Figure 44. RIP Global Statistics Page***

You can click Clear to reset all statistics to zero and Refresh to display any newly accumulated data.

# *Part 4*

## *Security Features*

# About Part 4

Part 4 describes features you can configure to provide security to your network.

Part 4 contains the following chapters:

- **Chapter 12, "Configuring Network Address Translation,"** explains how NAT works to allow one public Internet address to be shared among multiple PCs on your LAN. This chapter explains how to configure NAT rules of various types.
- **Chapter 13, "Configuring Firewall Settings,"** describes the protections available in the embedded firewall and how to enable and disable them.
- **Chapter 14, "Configuring Filters and Blocking Protocols,"** describes how to create filters that allow or disallow various types of content and how to block certain types of protocols from entering or exiting your LAN.

# 12 Configuring Network Address Translation

This chapter provides an overview of Network Address Translation (NAT) and instructions for modifying the Hurricane 9200/S's default configuration.

## Overview of NAT

Network Address Translation is a method for disguising the private IP addresses you use on your LAN as the public IP address you use on the Internet. You define NAT rules that specify exactly how and when to translate between public and private IP addresses.

**Definitions**

*A **private IP address** is created by a network administrator for use only on a LAN, whereas a **public IP address** is purchased from the Internet Corporation for Assigned Names and Numbers (ICANN) for use on the Internet. Typically, your ISP provides a public IP address for your entire LAN, and you define the private addresses for computers on your LAN.*

In a typical NAT setup, your ISP provides you with a single public IP address to use for your entire network. Then, you assign each computer on your LAN a unique private IP address. (Or, you define a pool of private IP addresses for dynamic assignment to your computers, as described in Chapter 8.) On the Hurricane 9200/S, you set up a NAT rule to specify that whenever one of your computers communicates with the Internet, (that is, it sends and receives IP *data packets*) its private IP address—which is referenced in each packet—will be replaced by the LAN's public IP address.

**Definitions**

*An **IP data packet** contains bits of data bundled together in a specific format for efficient transmission over the Internet. Such packets are the building blocks of all Internet communication. Each packet contains header information that identifies the IP address of the computer that initiates the communication (the **source IP address**), the port number that the router associates with that computer (the **source port number**), the IP address of the targeted Internet computer (the **destination IP address**), and other information.*

When this type of NAT rule is applied, because the source IP address is swapped out, it appears to other Internet computers as if the data packets are actually originating from the computer assigned your public IP address (in this case, the Hurricane 9200/S).

The NAT rule could further be defined to disguise the source port in the data packet (i.e., change it to another number), so that outside computers will not be able to determine the actual port from which the packet originated. Data packets that arrive in response contain the public IP address as the destination IP address and the disguised source port number. The Hurricane 9200/S changes the IP address and source port number back to the original values (having kept track of the changes it made earlier), and then routes the packet to the originating computer.

NAT rules such as these provide several benefits:

- They eliminate the need for purchasing multiple public IP addresses for computers on your LAN. You can make up your own private IP addresses at no cost, and then have them translated to the public IP address when your computers access the Internet.
- They provide a measure of security for you LAN by enabling you to assign private IP addresses and then have these and the source port numbers swapped out before your computers access the Internet.

The type of NAT function described above is called *network address port translation* (NAPT). You can use other types, called *flavors*, of NAT for other purposes; for example, providing outside access to your LAN or translating multiple private addresses to multiple public addresses.

For a description of NAPT rules, see page 125.

## Viewing NAT Global Settings and Statistics

To view your NAT settings, log into Configuration Manager, and click the Services tab. The NAT Configuration page displays by default:

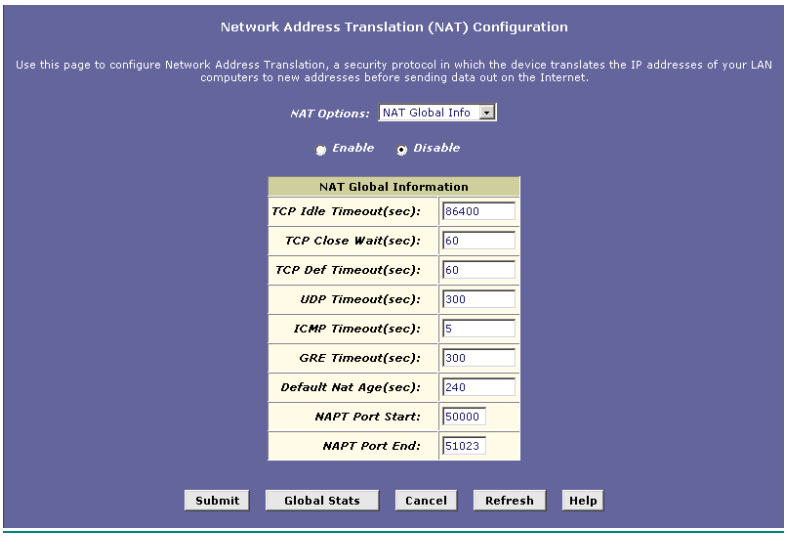



***Figure 45. NAT Configuration Page***

The NAT Configuration page contains the following elements:

- The NAT Options drop-down list, which provides access to the NAT Configuration page and Global Information table (shown by default and in Figure 45), the NAT Rule Configuration page (see Figure 47), and the NAT Translations page (see Figure 49).
- Enable/Disable radio buttons, which allow you to turn on or off the NAT feature.
- The NAT Global Information table, which displays the following settings that apply to all NAT rule translations:

| Field | Description |
|---|---|
| *TCP Idle Timeout (sec)*<br>*TCP Close Wait (sec)*<br>*TCP Def Timeout (sec)* | When two computers communicate via the Internet, a TCP-based communication session is created between them to control the exchange of data packets. The TCP session can be viewed as being in one of three states, depending on the types of packets being transferred: the **establishing state**, where the connection is being set up, the **active state**, where the connection is being used to transfer data, and the **closing state**, in which the connection is being shut down. When a NAT rule is in effect on a TCP session in the active state, the session will timeout if no packets are received for the time specified in *TCP Idle Timeout*. When in the closing state, the session will timeout if no packets are received for the time specified in *TCP Close Wait*. When in the establishing state, the session will timeout if no packets are received for the time specified in *TCP Def Timeout*. |
| *UDP Timeout (sec)* | Same as TCP Idle Timeout, but for UDP-based communication sessions. |
| *ICMP Timeout (sec)* | Same as TCP Idle Timeout, but for ICMP-based communication sessions. |
| *GRE Timeout (sec)* | Same as TCP Idle Timeout, but for GRE-based communication sessions. |
| *Default Nat Age (sec)* | For all other NAT translation sessions, the number of seconds after which a translation session will no longer be valid if no packets are received. |
| *NAPT Port Start/End* | When an NAPT rule is defined, the source ports will be translated to sequential numbers in this range. |

If you change any values, click Submit. Then click the Admin tab and commit your changes to permanent system memory (see page 45).

You can click Global Stats to view accumulated data on how many NAT rules have been invoked and how much data has been translated. A page displays similar to the one shown in Figure 46.

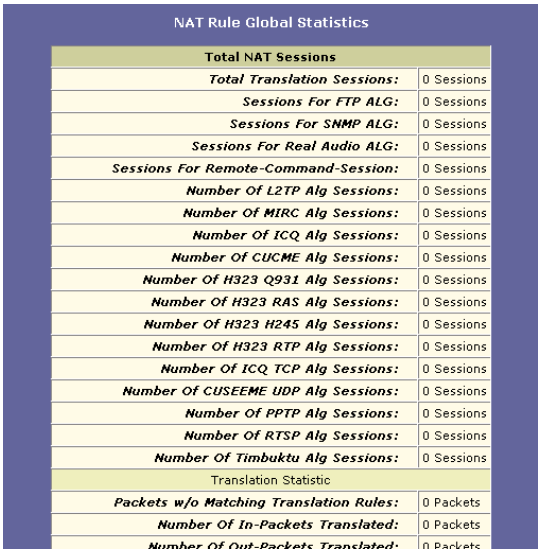

NAT Rule Global Statistics
Total NAT Sessions
Total Translation Sessions: 0 Sessions
Sessions For FTP ALG: 0 Sessions
Sessions For SNMP ALG: 0 Sessions
Sessions For Real Audio ALG: 0 Sessions
Sessions For Remote-Command-Session: 0 Sessions
Number Of L2TP Alg Sessions: 0 Sessions
Number Of MIRC Alg Sessions: 0 Sessions
Number Of ICQ Alg Sessions: 0 Sessions
Number Of CUCME Alg Sessions: 0 Sessions
Number Of H323 Q931 Alg Sessions: 0 Sessions
Number Of H323 RAS Alg Sessions: 0 Sessions
Number Of H323 H245 Alg Sessions: 0 Sessions
Number Of H323 RTP Alg Sessions: 0 Sessions
Number Of ICQ TCP Alg Sessions: 0 Sessions
Number Of CUSEEME UDP Alg Sessions: 0 Sessions
Number Of PPTP Alg Sessions: 0 Sessions
Number Of RTSP Alg Sessions: 0 Sessions
Number Of Timbuktu Alg Sessions: 0 Sessions
Translation Statistic
Packets w/o Matching Translation Rules: 0 Packets
Number Of In-Packets Translated: 0 Packets

***Figure 46. NAT Rule Global Statistics Page***

The table provides basic information for each NAT rule you have set up. You can click

to restart the accumulation of the statistics at their initial values.

## Viewing NAT Rules and Rule Statistics

To view the NAT rules currently defined on your system, select **NAT Rule Entry** in the NAT Options drop-down list. The NAT Rule Configuration page displays:

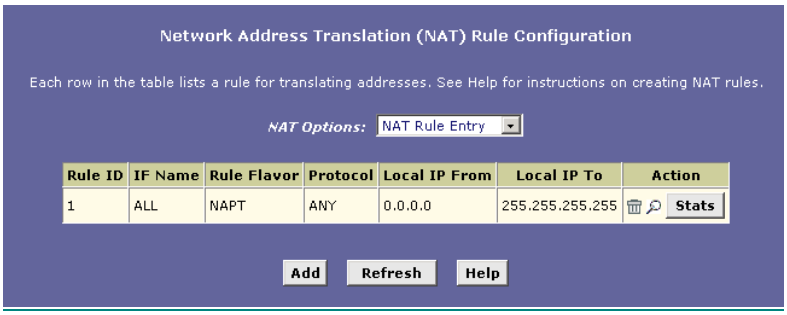



***Figure 47. NAT Rule Configuration Page***

The NAT Rule Configuration table displays a row containing basic information for each rule. For a description of these fields, refer to the instructions for adding rules (pages 125 through 134).

From the NAT Rule Configuration page, you can click Add to add a new rule, or use the icons in the right column to delete (🗑) or view details on (🔍) a rule. To view data on how often a specific NAT rule has been used, click Stats in the Action(s) column. A page displays similar to the one shown in Figure 48:

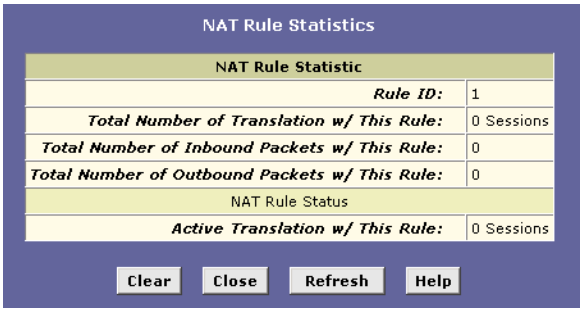

NAT Rule Statistics
NAT Rule Statistic
Rule ID: 1
Total Number of Translation w/ This Rule: 0 Sessions
Total Number of Inbound Packets w/ This Rule: 0
Total Number of Outbound Packets w/ This Rule: 0
NAT Rule Status
Active Translation w/ This Rule: 0 Sessions
Clear
Close
Refresh
Help

***Figure 48. NAT Rule Statistics Page***

The statistics show how many times this rule has been invoked and how many currently active sessions are using this rule. You can click Clear to reset the statistics to zeros and Refresh to display newly accumulated data.

## Viewing Current NAT Translations

To view a list of NAT translations that have recently been performed and which remain in effect (for any of the defined rules), select **NAT Translations** from the NAT Options drop-down list. The NAT Translations page displays:

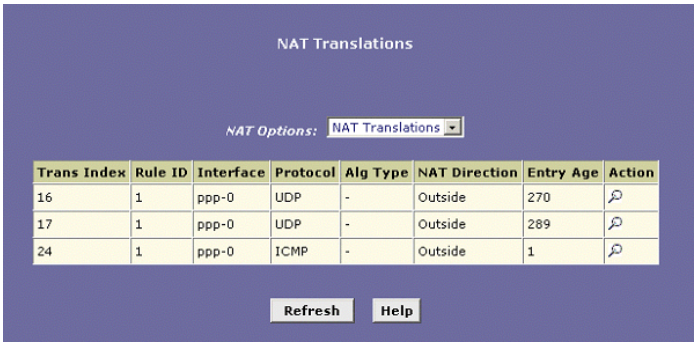



***Figure 49. NAT Translations Page***

For each current NAT translation session, the table contains the following fields:

| Field | Description |
|---|---|
| *Trans Index* | The sequential number assigned to the IP session used by this NAT translation session. |
| *Rule ID* | The ID of the NAT rule invoked. |
| *Interface* | The device interface on which the NAT rule was invoked (from the rule definition). |
| *Protocol* | The IP protocol used by the data packets that are undergoing translations (from the rule definition) Example: TCP, UDP, ICMP. |
| *Alg Type* | The *Application Level Gateway* (ALG), if any, that was used to enable this NAT translation (ALGs are special settings that certain applications require in order to work while NAT is enabled). |
| *NAT Direction* | The direction (Inside or Outside) of the translation. A NAT direction is assigned to each interface; the Ethernet and USB interfaces are defined as *inside*, and the WAN interfaces are defined as *outside*. The NAT direction is determined by the interface on which the rule is invoked. |
| *Entry Age* | The elapsed time, in seconds, of the NAT translation session. |

You can click 🔎 in the Action column to view additional details about a NAT translation session:

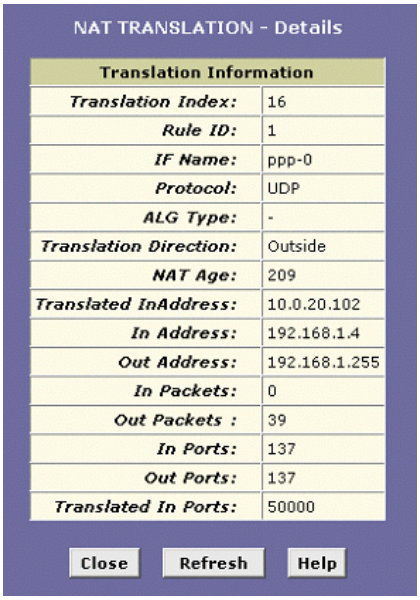



***Figure 50. NAT Translation – Details Page***

In addition to the information displayed in the NAT Translations table, this table displays the following for the selected current translation sessions:

| Field | Description |
|---|---|
| *Translated InAddress* | The public IP address to which the private IP address was translated. |
| *In Address* | The private IP address that was translated. |
| *Out Address* | The IP address of the outside destination (web, ftp site, etc.). |
| *In/Out Packets* | The number of incoming and outgoing IP packets that have been translated in this translation session. |
| *In Ports* | The actual port number corresponding to the LAN computer. |
| *Out Ports* | The port number associated with the destination address. |
| *Translated In Ports* | The port number to which the LAN computer's actual port number was translated. |

## Adding NAT Rules

This section explains how to create rules for each NAT flavor.

Note

*You cannot edit existing NAT rules. To change a rule setup, delete it and add a new rule with the new settings.*

### The NAPT rule: Translating between private and public IP addresses

Follow these instructions to create a rule for translating the private IP addresses on your LAN to your public IP address. This type of rule uses the NAT flavor *NAPT*, which was used in your default configuration. The NAPT flavor translates private source IP addresses to a single public IP address. The NAPT rule also translates the source port numbers to port numbers that are defined on the NAT Global Configuration page (see page 119). The introduction to NAT on page 117 describes how the NAPT rule works.

1. Click the NAT tab, and then select **NAT Rule Entry** from the NAT Options drop-down list.

   The NAT Rule entry page displays, as shown on page 122.

2. Click Add to display the NAT Rule – Add page.

3. From the Rule Flavor drop-down list, select *NAPT*.

   The page redisplays with only those fields that are appropriate for the NAPT rule flavor:

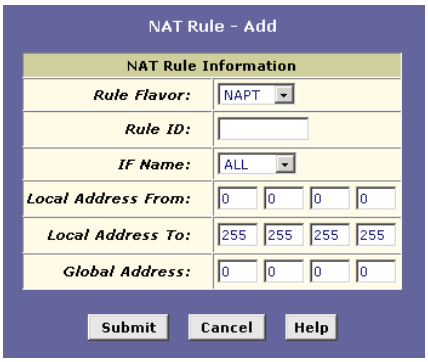



***Figure 51. NAT Rule – Add Page (NAPT Flavor)***

4. Enter a Rule ID.

   The Rule ID determines the order in which rules are invoked (the lowest numbered rule is invoked first, and so on). If you define two or more rules that act on the same set of IP addresses, be sure to assign the Rule ID so that the higher priority rules are invoked first. It is recommended that you specify rule IDs as multiples of 5 or 10 so that, in the future, you can insert a rule between two existing rules.

   When a data packet matches a rule, the data is acted upon according to that rule and is not subjected to higher-numbered rules.

5. From the IFName drop-down list, select the interface on the device to which this rule applies.

   Typically, NAT rules are used for communication between your LAN and the Internet. Because the device uses the WAN interface (which may be named *ppp-0*, *eoa-0*, or *ipoa-0*) to connect your LAN to your ISP, it is the usual IFName selection.

6. In the Local Address From field and Local Address To fields, type the starting and ending IP addresses, respectively, of the range of private address you use on your network that you want to be translated.

   You can specify that data from all LAN addresses should be translated by typing 0 (zero) in each From field and 255 in each To field. Or, type the same address in both fields if the rule only applies to one computer.

7. In the Global Address From and Global Address To fields, type the public IP address assigned to you by your ISP.

   If you have multiple WAN interfaces, in both fields type the IP address of the interface to which this rule applies. This rule will not be enforced for data that arrives on other WAN interfaces.

   If you have multiple WAN interfaces and want the rule to be enforced on a range of them, type the starting and ending IP addresses of the range.

8. Click .

9. When a page displays to confirm your change, click to return to the NAT Configuration page.

   The new rule should display in the NAT Rule Configuration table.

10. Ensure that the Enable radio button is selected, and then click .

    A page displays to confirm your changes.

11. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

### The RDR rule: Allowing external access to a LAN computer

You can create an RDR rule to make a computer on your LAN, such as a Web or FTP server, available to Internet users without having to obtain a public IP address for that computer. The computer's private IP address is translated to your public IP address in all incoming and outgoing data packets.

**Note**

*Without an RDR rule (or Bimap rule described on page 133), the Hurricane 9200/S blocks attempts by external computers to access your LAN computers.*

The following example illustrates using the RDR rule to provide external access to your web server:

Your ADSL/Ethernet router receives a packet containing a request for access to your Web server. The packet header contains the public address for your LAN as the destination IP address, and a destination port number of 80. Because you have set up an RDR rule for incoming packets with destination port 80, the device recognizes the data as a request for Web server access. The device changes the packet's destination address to the private IP address of your Web server and forwards the data packet to it.

Your Web server sends data packets in response. Before the ADSL/Ethernet router forwards them on to the Internet, it changes the source IP address in the data packets from the Web server's private address to your LAN's public address. To an external Internet user then, it appears as if your Web server uses your public IP address.

Figure 52 shows the fields used to establish an RDR rule:

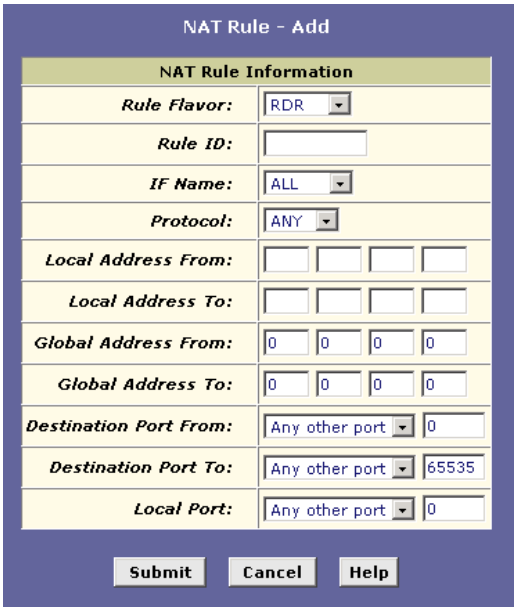



***Figure 52. NAT Rule – Add Page (RDR Flavor)***

Follow these instructions to add an RDR rule (see steps 1-4 under "The NAPT rule" on page 125 for specific instructions corresponding to steps 1 and 2 below):

1. Display the NAT Rule – Add Page, select **RDR** as the Rule Flavor, if necessary, and enter a Rule ID.
2. Select the interface on which this rule will be effective.
3. Select a protocol to which this rule applies, or choose **ANY**.

   This selection specifies which type of Internet communication will be subject to this translation rule. You can select ANY if the rule applies to all data. Or, select TCP, UDP, ICMP, or a number from 1-255 that represents the Internet Assigned Numbers Authority (IANA)-specified protocol number.
4. In the Local Address From and Local Address To fields, type the same private IP address, or the lowest and highest addresses in a range:

   - If you type the same IP address in both fields, incoming traffic that matches the criteria you specify in steps 5 and 6 will be redirected to that IP address.
   - If you type a range of addresses, incoming traffic will be redirected to any available computer in that range. This option would typically be used for load balancing, whereby traffic is distributed among several redundant servers to help ensure efficient network performance.

   These addresses should correspond to private addresses already in use on your network (either assigned statically to your PCs or assigned dynamically using DHCP, as discussed in "Quick Start Part 2 — Configuring Your Computers").
5. In the Global Address From and Global Address To fields, type the public IP address assigned to you by your ISP.

   If you have multiple WAN (PPP) interfaces, note that this rule will not be enforced for data that arrives on WAN interfaces not specified here.

   If you have multiple WAN interfaces and want the rule to be enforced on more than one of them (or all), enter a range of IP addresses that includes them.
6. From the Destination Port From and Destination Port To drop-down lists, select the port type of the computer you are making publicly available, or leave them set to **Any other port**.

   If you want to specify a port type that is not available in the drop-down lists, you can instead type the port ID number in text boxes to the right. You can specify a range using the From/To fields if you want the rule to apply to a range of port types, or enter the same port number in both fields.

   If you leave the selection set to *Any other port*, then incoming data will not be checked for the destination port type.

A port ID identifies the specific function of the computer connected to it, and therefore can limit the types of data that pass to and from the computer. For example, Web (HTTP) servers are usually identified by port number 80; packets containing traffic destined for a Web server will contain this port ID. The Internet Assigned Numbers Authority (IANA) assigns port numbers for common types of servers and functions.

7. If the LAN computer that you are making publicly available is configured to use a non-standard port number for the type of traffic it receives, type the non-standard port number in the Local Port field.

   This option translates the standard port number in packets destined for your LAN computer to the non-standard number you specify. For example, if your Web server uses (non-standard) port 2000, but you expect incoming data packets to refer to (standard) port 80, you would enter 2000 here (and select HTTP or type 80 in the Destination Port fields). The headers of incoming packets destined for port 80 will be modified to refer to port 2000. The packet will then be routed appropriately to the web server.

8. Follow steps 8-11 under "The NAPT rule" on page 125 to submit your changes.

### The Basic rule: Performing 1:1 translations

The Basic flavor translates the private (LAN-side) IP address to a public (WAN-side) address, like NAPT rules. However, unlike NAPT rules, Basic rules do not also translate the port numbers in the packet header; they are passed through untranslated. Therefore, the Basic rule does not provide the same level of security as the NAPT rule.

Figure 53 shows the fields used for adding a Basic rule.

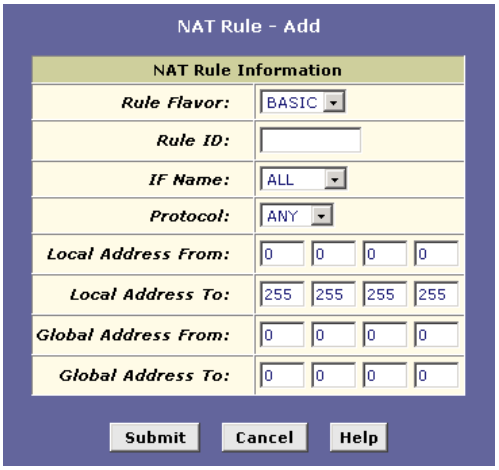



***Figure 53. NAT Rule – Add Page (Basic Flavor)***

Follow these instructions to add a Basic rule (see steps 1-4 under "The NAPT rule" on page 125 for specific instructions corresponding to steps 1 and 2 below):

1. Display the NAT Rule – Add Page, select **BASIC** as the Rule Flavor, and enter a Rule ID.
2. Select the interface on which this rule will be effective.
3. Select a protocol to which this rule applies, or choose **ANY**.

   This selection specifies which type of Internet communication will be subject to this translation rule. You can select ALL if the rule applies to all data. Or, select TCP, UDP, ICMP, or a number from 1-255 that represents the Internet Assigned Numbers Authority (IANA)-specified protocol number.
4. In the Local Address From and Local Address To fields, type the starting and ending IP addresses that identify the range of private address you want to be translated. Or, type the same address in both fields.

   If you specify a range, each address will be translated in sequence to a corresponding address in a range of global addresses (which you specify in step 5).

   You can create a Basic rule for each specific address translation to occur. The range of addresses should correspond to private addresses already in use on your network, whether assigned statically to your PCs, or assigned dynamically using DHCP.

5. In the Global Address From and Global Address To fields, type the starting and ending addresses that identify the pool of public IP addresses that the private addresses should be translated to. Or, type the same address in both fields (if you also specified a single address in step 4).
6. Follow steps 8-11 under "The NAPT rule" on page 125 to submit your changes.

### The Filter rule: Configuring a Basic rule with additional criteria

Like the Basic flavor, the Filter flavor translates public and private IP addresses on a one-to-one basis. The Filter flavor extends the capability of the Basic rule. Refer to “The Basic Rule” on page 130 for a general description.

You can use the Filter rule if you want an address translation to occur only when your LAN computers initiate access to specific destinations. The destinations can be identified by their IP addresses, port type (which identifies it as a FTP or Web server, for example), or both.

Figure 54 shows the fields used to establish a Filter rule.

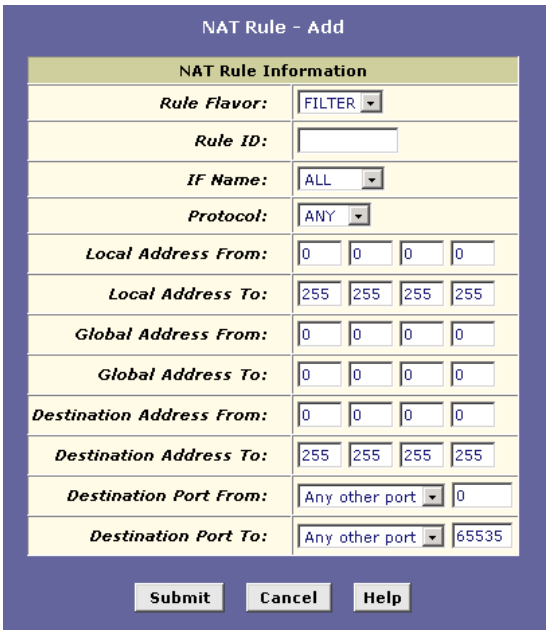

NAT Rule - Add
NAT Rule Information
Rule Flavor: FILTER
Rule ID:
IF Name: ALL
Protocol: ANY
Local Address From: 0 0 0 0
Local Address To: 255 255 255 255
Global Address From: 0 0 0 0
Global Address To: 0 0 0 0
Destination Address From: 0 0 0 0
Destination Address To: 255 255 255 255
Destination Port From: Any other port 0
Destination Port To: Any other port 65535
Submit
Cancel
Help

***Figure 54. NAT Rule—Add Page (Filter Flavor)***

Follow these instructions to add a Filter rule (see steps 1-4 under "The NAPT rule" on page 125 for specific instructions corresponding to steps 1 and 2 below):

1. Display the NAT Rule – Add Page, select **FILTER** as the Rule Flavor, and enter a Rule ID.
2. Select the interface on which this rule will be effective.

3. Select a protocol to which this rule applies, or choose **ANY**.

   This selection specifies which type of Internet communication will be subject to this translation rule. You can select ANY if the rule applies to all data. Or, select TCP, UDP, ICMP, or a number from 1-255 that represents the Internet Assigned Numbers Authority (IANA)-specified protocol number.

4. In the Local Address From and Local Address To fields, type the starting and ending IP addresses that identify the range of private address you want to be translated. Or, type the same address in both fields.

   If you specify a range, each address will be translated in sequence to a corresponding address in a range of global addresses (which you specify in step 5).

   The address (or range of addresses) should correspond to private address (or addresses) already in use on your network. These may be assigned statically to your PCs or dynamically using DHCP, as discussed in the Quick Start chapter.

5. In the Global Address From and Global Address To fields, type the starting and ending address that identify the range of public IP addresses to translate your private addresses to. Or, type the same address in both fields (if you also specified a single address in step 4).

6. In the Destination Address From/To fields, specify a destination address (or range) if you want this rule to apply only to outbound traffic to the address (or range).

   If you enter only the network ID portion of the destination address, then the rule will apply to outbound traffic from all computers on network.

7. From the Destination Port From/To drop-down lists, select a port type if you want the rule to apply only to outbound traffic to servers of this type. Otherwise, leave them set to **Any other port**.

   If you want to specify a port type that is not available in the drop-down lists, you can instead type the port ID number in the text boxes to the right. You can specify a range using the From/To fields if you want the rule to apply to a range of port types, or enter the same port number in both fields.

   If you leave the selection set to *Any other port*, then outbound data will not be checked for the destination port type.

   See step 6 for creating an RDR rule on page 128 for an explanation of port IDs.

8. Follow steps 8-11 under "The NAPT rule" on page 125 to submit your changes.

### The Bimap rule: Performing two-way translations

Unlike the other NAT flavors, the Bimap flavor performs address translations in both the outgoing and incoming directions.

In the incoming direction, when the specified Hurricane 9200/S interface receives a packet with your public IP address as the destination address, this address is translated to the private IP address of a computer on your LAN. To the external computer, it appears as if the access is being made to the public IP address, when, in fact, it is communicating with a LAN computer.

In the outgoing direction, the private source IP address in a data packet is translated to the LAN's public IP address. To the rest of the Internet, it appears as if the data packet originated from the public IP address.

Bimap rules can be used to provide external access to a LAN device. They do not provide the same level of security as RDR rules, because RDR rules also reroute incoming packets based on the port ID. Bimap rules do not account for the port number, and therefore allow external access regardless of the destination port type specified in the incoming packet.

Figure 55 shows the fields used to establish a Bimap rule.

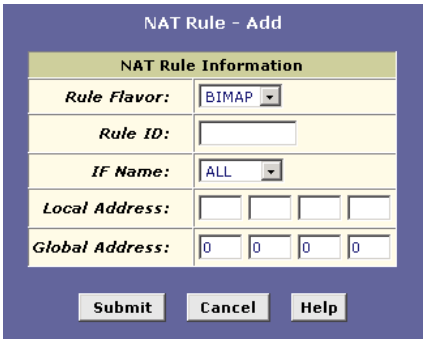



***Figure 55. NAT Rule – Add Page (Bimap Flavor)***

Follow these instructions to add a Bimap rule (see steps 1-4 under "The NAPT rule" on page 125 for specific instructions corresponding to steps 1 and 2 below):

1. Display the NAT Rule – Add Page, select **BIMAP** as the Rule Flavor, and enter a Rule ID.
2. Select the interface on which this rule will be effective.
3. In the Local Address field, type the private IP address of the computer to which you are granting external access.
4. In the Global Address field, type the address that you want to serve as the publicly known address for the LAN computer.
5. Follow steps 8-11 under "The NAPT rule" on page 125 to submit your changes.

### The Pass rule: Allowing specific addresses to pass through untranslated

You can create a Pass rule to allow a range of IP addresses to remain untranslated when another rule would otherwise do so.

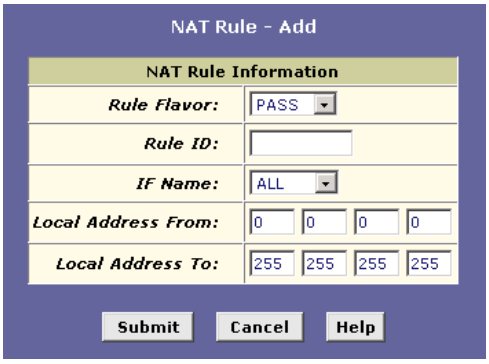



***Figure 56. NAT Rule – Add Page (Pass Flavor)***

The Pass rule must be assigned a rule ID that is a lower number than the ID assigned to the rule it is intended to pass. In you want a specific IP address or range of addresses to not be subject to an existing rule, say rule number 5, then you can create a Pass rule with an ID number from 1 to 4.

Follow these instructions to add a Pass rule (see steps 1-4 under "The NAPT rule" on page 125 for detailed instructions corresponding to steps 1 and 2 below):

1. Display the NAT Rule – Add Page, select **PASS** as the Rule Flavor, and enter a Rule ID.
2. Select the interface on which this rule will be effective.
3. In the Local Address From and Local Address To fields, type the lowest and highest IP addresses that define the range of private address you want to be passed without translation.

   If you want the Pass rule to act on only one address, type that address in both fields.
4. Follow steps 7-12 under "The NAPT rule" on page 125 to submit your changes.

# 13 Configuring Firewall Settings

Configuration Manager provides built-in firewall functions, enabling you to protect the system against denial of service (DoS) attacks and other unwelcome or malicious accesses to your LAN. You can also specify how to monitor attempted attacks, and who should be automatically notified.

## Configuring Global Firewall Settings

Follow these instructions to configure global firewall settings:

1. Log into Configuration Manager, click the Services tab, and then click **Firewall** in the task bar.

   The Firewall Configuration page displays:

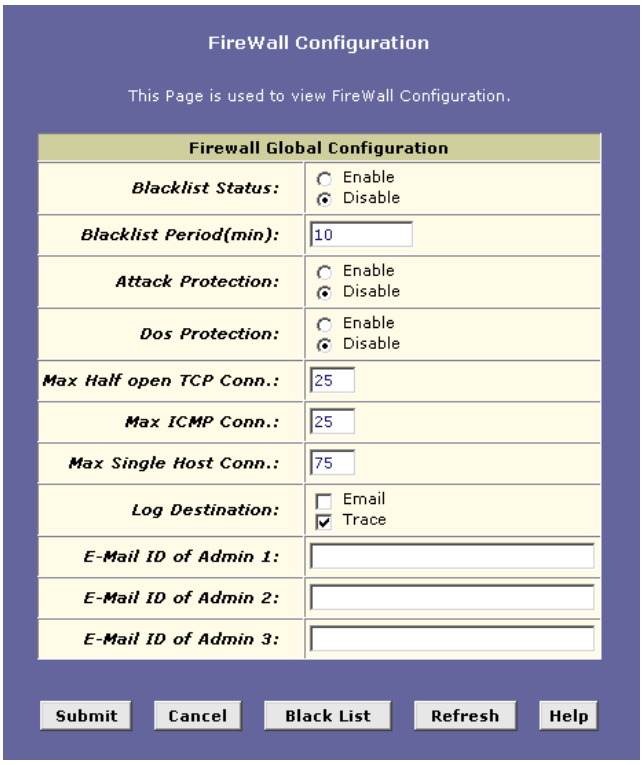



***Figure 57. Firewall Configuration Page***

2. Configure the following settings as needed:

| Field | Description |
|---|---|
| *Black List Status* | If you want the device to maintain a blacklist, click the Enable radio button. Click the Disable radio button if you do not want to maintain a list. For more information, see "Managing the Blacklist" on page 138. |
| *Black List Period(min)* | Specifies the number of minutes that a computer's IP address will remain on the blacklist (i.e., all traffic originating from that computer will be blocked from passing through any interface on the ADSL/Ethernet router). |
| *Attack Protection* | Click the Enable radio button to use the built-in firewall protections that prevent the following common types of attacks:<br>o IP Spoofing: Sending packets over the WAN interface using an internal LAN IP address as the source address.<br>o Tear Drop: Sending packets that contain overlapping fragments.<br>o Smurf and Fraggle: Sending packets that use the WAN or LAN IP broadcast address as the source address.<br>o Land Attack: Sending packets that use the same address as the source and destination address.<br>o Ping of Death: Illegal IP packet length. |
| *DoS Protection* | Click the Enable radio button to use the following denial of service protections:<br>o SYN DoS<br>o ICMP DoS<br>o Per-host DoS protection |
| *Max Half open TCP Connection* | Sets the percentage of concurrent IP sessions that can be in the half-open state. In ordinary TCP communication, packets are in the half-open state only briefly as a connection is being initiated; the state changes to active when packets are being exchanged, or closed when the exchange is complete. TCP connections in the half-open state can use up the available IP sessions.<br>If the percentage is exceeded, then the half-open sessions will be closed and replaced with new sessions as they are initiated. |
| *Max ICMP Connection* | Sets the percentage of concurrent IP sessions that can be used for ICMP messages.<br>If the percentage is exceeded, then older ICMP IP sessions will be replaced by new sessions as the are initiated. |
| *Max Single Host Connection* | Sets the percentage of concurrent IP session that can originate from a single computer. This percentage should take into account the number of hosts on the LAN. |

| Field | Description |
|---|---|
| *Log Destination* | Specifies how attempted violations of the firewall settings will be tracked. Records of such events can be sent via Ethernet to be handled by a system utility (*Trace*) or can e-mailed to specified administrators. |
| *E-mail ID of Admin 1/2/3* | Specifies the e-mail addresses of the administrators who should receive notices of any attempted firewall violations. Type the addresses in standard internet e-mail address format, e.g., *jxsmith@onecompany.com*.<br>The e-mail message will contain the time of the violation, the source address of the computer responsible for the violation, the destination IP address, the protocol being used, the source and destination ports, and the number violations occurring the previous 30 minutes. If the ICMP protocol is being used, then instead of the source and destination ports, the e-mail will report the ICMP code and type. |

3. Click Submit.
4. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

## Managing the Blacklist

If data packets are received that violate the firewall settings or any of the IP filter rules, then the source IP address of the offending packets can be blocked from such accesses for a specified period of time. You can enable or disable use of the black list using the settings described above. The source computer remains on the black list for the period of time that you specify.

To view the list of currently blacklisted computers, click Black List at the bottom of the Firewall Configuration page. The Firewall Blacklisted Hosts page displays:

***Figure 58. Firewall Blacklisted Hosts Page***

The table displays the following information for each entry:

| Field | Description |
|---|---|
| *Host IP Address* | The IP address of the computer that sent the packet(s) that caused the violation |
| *Reason* | A short description of the type of violation. If the packet violated an IP filter rule, the custom text from the Log Tag field will display. (See "Creating IP Filter Rules" on page 142.) |
| *IPF Rule ID* | If the packet violated an IP filter rule, this field will display the ID assigned to the rule. |
| *Action(s)* | Displays an icon (🗑) you can click on to delete the entry from the list, if you want it to be removed prior to its automatic timed expiration. |

# 14 Configuring Filters and Blocking Protocols

This chapter describes Configuration Manager features that enable you to control the data passing through your network:

- The **IP filter** feature enables you to create rules to block attempts by certain computers on your LAN to access certain types of data or Internet locations. You can also block incoming access to computers on your LAN. Although IP filter rules provide a very flexible and powerful tool to enhance network security and control user activity, they can also be complex and generally require an advanced understanding of IP protocols.
- The **bridge filter** feature is similar to the IP filter feature but operates at a lower protocol level. While IP filter rules act on IP data packets (known as “layer 3” data), bridge filter rules act on Ethernet and similar packets (often referred to as “layer 2” or “MAC layer” data).
- The **blocked protocols** feature enables you to select from a predefined list the protocol that you want to block. All data passed to the ADSL/Ethernet router using a blocked protocol will be discarded, without consideration of the source computer, destination computer, or the device interface on which it was received.

## Configuring IP Filters

When you define an IP filter rule and enable the feature, you instruct the Hurricane 9200/S to examine each data packet it receives to determine whether it meets criteria set forth in the rule. The criteria can include the size of the packet, the network or internet protocol it carries, the direction in which it is traveling (for example, from the LAN to the Internet or vice versa), the IP address of the sending computer, the destination IP address, and other characteristics of the packet data.

If the packet matches the criteria established in a rule, the packet can either be accepted (forwarded towards its destination), or denied (discarded), depending on the action specified in the rule.

### Viewing Your IP Filter Configuration

To view your current IP filter configuration, log into Configuration Manager, click the Services tab, and then click **IP Filter** in the task bar. The IP Filter Confirmation page displays:

IP Filter Configuration
This Page is used to View and Modify IP Filter Global and Rule Configuration.
Security Level: None
Public Default Action: Accept
Private Default Action: Deny
DMZ Default Action: Accept
Rule ID | I/F | Apply Stateful Inspection | Direction | Rule Action | In I/F | Log Option | Rule Description | Oper. Status | Action(s)
10 | ALL | Disable | Incoming | Deny | N/A | Disable | - | Stats
20 | ALL | Disable | Incoming | Deny | N/A | Disable | 1.Dest IP equal to 255.255.255.255 | Stats
30 | Private | Enable | Incoming | Accept | N/A | Disable | - | Stats
40 | Private | Enable | Outgoing | Accept | ALL | Disable | - | Stats
50 | Private | Enable | Outgoing | Accept | DMZ | Disable | 1.Protocol eq UDP 2.Dest Port equal to 53 | Stats
60 | Private | Enable | Outgoing | Accept | DMZ | Disable | 1.Protocol eq TCP 2.TCP Flag All 3.Dest Port equal to 53 | Stats
70 | Private | Enable | Outgoing | Accept | DMZ | Disable | 1.Protocol eq TCP 2.TCP Flag All 3.Dest Port equal to 25 | Stats
80 | Private | Enable | Outgoing | Accept | DMZ | Disable | 1.Protocol eq TCP 2.TCP Flag All 3.Dest Port equal to 110 | Stats
Submit
Cancel
Add
Session
Refresh
Help

***Figure 59. IP Filter Confirmation Page***

The IP Filter Configuration page displays global settings that you can modify and the IP filter rule table, which shows all currently established rules. See "Creating IP Filter Rules" on page 142 for a description of the items that make up a rule. When rules are defined, you can use the icons that display in the Actions column to edit ( ), delete ( ), and view details on ( ) the corresponding rule.

### Configuring IP Filter Global Settings

The IP Filter Configuration page enables you to configure the following global IP filter settings.

- **Security Level:** This setting determines which IP filter rules take effect, based on the security level specified in each rule. For example, when *High* is selected, only those rules that are assigned a security value of *High* will be in effect. The same is true for the *Medium* and *Low* settings. When *None* is selected, IP filtering is disabled.
- **Private/Public/DMZ Default Action:** This setting specifies a default action to be taken (Accept or Deny) on private, public, or DMZ-type device interfaces when they receive packets that *do not* match any of the filtering rules. You can specify a different default action for each interface type. (You specify an interface's type when you create the interface; see the PPP configuration page, for example.)
  - A *public* interface typically connects to the Internet. PPP, EoA, and IPoA interfaces are typically public. Packets received on a public interface are subject to the most restrictive set of firewall protections defined in the software. Typically, the global setting for public interfaces is *Deny*, so that all accesses to your LAN initiated from external computers are denied (discarded at the public interface), except for those allowed by a specific IP filter rule.
  - A *private* interface connects to your LAN, such as the Ethernet interface. Packets received on a private interface are subject to a less restrictive set of protections, because they originate within the network. Typically, the global setting for private interfaces is *Accept*, so that LAN computers have access to the ADSL/Ethernet routers' Internet connection.
  - The term *DMZ* (de-militarized zone), in Internet networking terms, refers to computers that are available for both public and in-network accesses (such as a company's public Web server). Packets received on a DMZ interface — whether from a LAN or external source—are subject to a set of protections that is in between public and private interfaces in terms of restrictiveness. The global setting for DMZ-type interfaces may be set to *Deny* so that all attempts to access these servers are denied by default; the administrator may then configure IP filter rules to allow accesses of certain types.

### Creating IP Filter Rules

To create an IP filter rule, you set various criteria that must be met in order for the rule to be invoked. Use these instructions to add a new IP filter rule. Also refer to the examples on page 147:

1. On the IP Filter Configuration page, click **Add**.

   The IP Filter Rule – Add page displays:

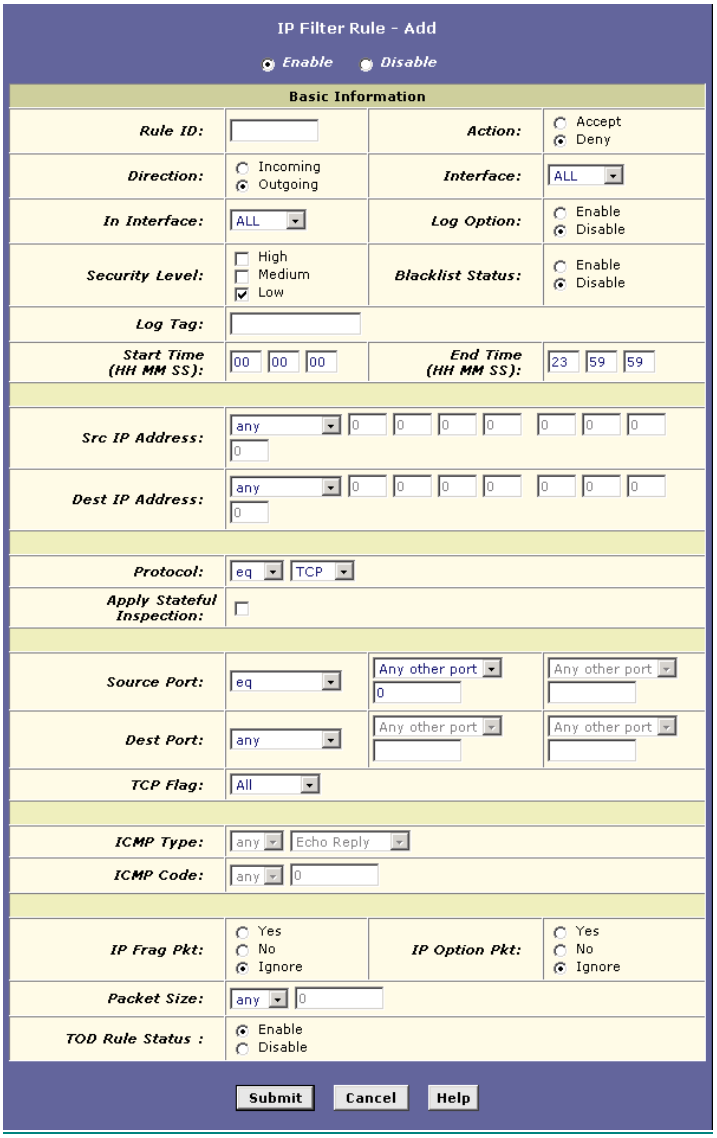



***Figure 60. IP Filter Rule – Add Page***

2. Enter or select data for each field that applies to your rule. The following table describes the fields:

| Field | Description |
|---|---|
| *Rule ID* | Each rule must be assigned a sequential ID number. Rules are processed from lowest to highest on each data packet, until a match is found. It is recommended that you assign rule IDs in multiples of 5 or 10 (e.g., *10*, *20*, *30*) so that you leave enough room between them for inserting new rules if necessary. |
| *Action* | The action that will be taken when a packet matches the rule criteria. The action can be *Accept* (forward to destination) or *Deny* (discard the packet). |
| *Direction* | Specifies whether the rule should apply to data packets that are incoming or outgoing on the selected interface.<br>*Incoming* refers to packets coming from the LAN, and *outgoing* refers to packets going to the Internet.<br>You can use rules that specify the incoming direction to restrict external computers from accessing your LAN. |
| *Interface* | The interface on the Hurricane 9200/S on which the rule will take effect. See the examples on page 147 for suggestions on choosing the appropriate interface for various rule types. |
| *In Interface* | The interface from which packets must have been forwarded to the interface specified in the previous selection. This option is valid only for the outgoing direction. |
| *Log Option* | When *Enabled* is selected, a log entry will be created on the system each time this rule is invoked. The log entry will include the time of the violation, the source address of the computer responsible for the violation, the destination IP address, the protocol being used, the source and destination ports, and the number violations occurring in the previous x minutes. (Logging may be helpful when troubleshooting.) This information can also be e-mailed to designated administrators. See Chapter 13, “Configuring Firewall Settings” for instructions. |
| *Security Level* | The security level that must be enabled globally for this rule to take affect. A rule will be active only if its security level is the same as the globally configured setting (shown on the main IP Filter Configuration page). For example, if the rule is set to *Medium* and the global firewall level is set to *Medium*, then the rule will be active; but if the global firewall level is set to *High* or *Low*, then the rule will be inactive. |

| Field | Description |
|---|---|
| *Black List Status* | Specifies whether or not a violation of this rule will result in the offending computer's IP address being added to the blacklist, which blocks the ADSL/Ethernet router from forwarding packets from that source for a specified period of time. See Chapter 13, "Configuring Firewall Settings" for instructions. |
| *Log Tag* | A description of up to 16 characters to be recorded in the log in the event that a packet violates this rule. Be sure to set the Log Option to *Enable* if you configure a Log Tag. |
| *Start/End Time* | The time range during which this rule is to be in effect, specified in military units. |
| *Src IP Address/Dest IP Address* | IP address criteria for the source computer(s) (from which the packet originates) and the destination computer. In the drop-down list, you can configure the rule to be invoked on packets containing:<br>**any**: *any* source IP address.<br>**lt**: *any* source IP address that is numerically *less than* the specified address.<br>**lteq**: any source IP address that is numerically *less than or equal to* the specified address.<br>**gt**: any source IP address that is numerically *greater than* the specified address.<br>**eq**: any source IP address that is numerically *equal to* the specified address.<br>**neq**: any source IP address that is *not equal to* the specified address.<br>**range**: any source IP address that is within the specified range, including its endpoints.<br>**out of range**: any source IP address that is outside the specified range.<br>**self**: the IP address of the ADSL/Ethernet router interface on which this rule takes effect.<br>**bcast**: (destination address only) Specifies that the rule will be invoked for any packets sent to the broadcast address for the receiving interface. (The broadcast address is used to send packets to all hosts on the LAN or subnet connected to the specified interface.) When you select this option, you do not need to specify the address, so the address fields are dimmed. |

| Field | Description |
|---|---|
| *Protocol* | The basic IP protocol criteria that must be met for rule to be invoked. Using the options in the drop-down list, you can specify that packets must contain the selected protocol (*eq*), that they must not contain the specified protocol (*neq*), or that the rule can be invoked regardless of the protocol (*any*). TCP, UDP, and ICMP are common IP protocols; others can be identified by number from 0-255, as defined by the Internet Assigned Numbers Authority (IANA). |
| *Apply Stateful Inspection* | When this option is enabled, packets are monitored for their state (i.e., whether a packet is the initiating packet or a subsequent packet in an ongoing communication, etc). This option provides a degree of security by blocking/dropping packets that are not received in the anticipated state. Such packets can signify an unwelcome attempt to gain access to a network. |
| *Source/Destination Port* | Port number criteria for the source computer(s) (from which the packet originates) and destination computer(s).<br>Port numbers identify the type of traffic that the computer or server can handle and are specified by the Internet Assigned Numbers Authority (IANA). For example, port number 80 indicates a Web server, 21 indicates an FTP server.<br>You can choose a port type by name from the drop-down lists or, if not available in the list, specify the IANA port number in the text boxes. Select *Any other port* if this criteria will not be used.<br>These fields will be dimmed (unavailable for entry) unless you have selected TCP or UDP as the protocol.<br>See the description of Src IP Address for the statement options (any, eq, gt, etc.) |
| *TCP Flag* | Specifies whether the rule should apply only to TCP packets that contain the synchronous (*SYN*) flag, only to those that contain the non-synchronous (*NOT-SYN*) flag, or to all TCP packets. This field will be dimmed (unavailable for entry) unless you selected TCP as the protocol. |
| *ICMP Type* | Specifies whether the value in the type field in ICMP packet headers will be used as criteria. The code value can be any decimal value from 0-255. You can specify that the value must equal (*eq*) or not equal (*neq*) the specified value, or you can select *any* to enable the rule to be invoked on all ICMP packets. This field will be dimmed (unavailable for entry) unless you specify ICMP as the protocol. |

| Field | Description |
|---|---|
| *ICMP Code* | Specifies whether the value in the code field in ICMP packet headers will be used as criteria. The code value can be any decimal value from 0-255. You can specify that the value must equal (*eq*) or not equal (*neq*) the specified value, or you can select *any* to enable the rule to be invoked on all ICMP packets. This field will be dimmed (unavailable for entry) unless you specify ICMP as the protocol. |
| *IP Frag Pkt* | Determines how the rule applies to IP packets that contain fragments. You can choose from the following options:<br>○ **Yes**: The rule will be applied only to packets that contain fragments.<br>○ **No**: The rule will be applied only to packets that do not contain fragments.<br>○ **Ignore**: (Default) The rule will be applied to packets whether or not they contain fragments, assuming that they match the other criteria. |
| *IP Option Pkt* | Determines whether the rule should apply to IP packets that have options specified in their packet headers.<br>○ **Yes:** The rule will be applied only to packets that contain header options.<br>○ **No:** The rule will be applied only to packets that do not contain header options.<br>○ **Ignore:** (Default) The rule will be applied to packets whether or not they contain header options, assuming that they match the other criteria. |
| *Packet Size* | Specifies that the IP filter rule will take affect only on packets whose size in bytes matches this criterion. (*lt* = less than, *gt* = greater than, *lteq* = less than or equal to, etc.) |
| *TOD Rule Status* | The Time of Day Rule Status determines how the Start Time/End Time settings are used.<br>○ **Enable:** (Default) The rule is in effect for the specified time period.<br>○ **Disable:** The rule is not in effect for the specified time period, but is effective at all other times. |

3. When you are done selecting criteria, ensure that the Enable radio button is selected at the top of the page, and then click Submit.

   After a confirmation page displays, the IP Filter Configuration page will redisplay with the new rule showing in the table.

   If the security level of the rule matches the globally configured setting, a green ball displays in the Status column for that rule, indicating that the rule is now in effect. A red ball displays when the rule is disabled or if its security level is different from the globally configured level.

4. Ensure that the Security Level and Private/Public/DMZ Default Action settings on the IP Filter Configuration page are configured as needed, then click Submit.

   A page displays to confirm your changes.

5. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

### IP filter rule examples

**Example 1.** Blocking a specific computer on your LAN from accessing Web servers on the Internet:

1. Add a new rule for outgoing packets on the ppp-0 interface from any incoming interface (this would include the eth-0 and usb-0 interfaces, for example).
2. Specify the source IP address of the computer you want to block.
3. Specify the Protocol as *TCP* and enable the Store State setting.
4. Specify the destination port as *80*, which is the well-known port number for web servers.
5. Enable the rule by clicking the radio button at the top of the page.
6. Click Submit to create the rule.
7. On the IP Filter Configuration page, set the Security Level to the same level you chose for the rule, and set both the Private Default Action and the Public Default Action to *Accept*.
8. Click Submit.
9. and commit your changes.

With this configuration, the specified computer will not be able to access the Web, but will be able to access FTP Internet sites (and any others that use destination port numbers other than 80).

**Example 2.** Blocking Telnet accesses to the Hurricane 9200/S:

1. Add a new rule for packets incoming on the ppp-0 interface.
2. Specify that the packet must contain the TCP protocol, and must be destined for port 23, the well-known port number used for the Telnet protocol.
3. Enable the rule by clicking the radio button at the top of the page.
4. Click Submit to create the rule, and commit your changes.

### Viewing IP Filter Statistics

For each rule, you can view statistics on how many packets were accepted or denied. Display the IP Filter Configuration page, and then click Stats in the row corresponding to the rule. The IP Filter Rule – Statistics page displays:

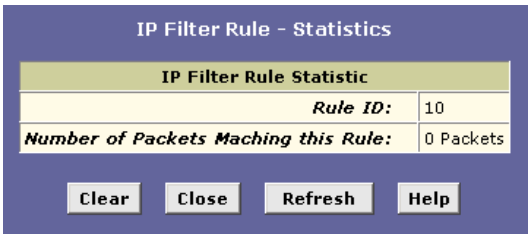



*Figure 61. IP Filter Rule – Statistics Page*

You can click Clear to reset the count to zero and Refresh to display newly accumulated data.

### Managing Current IP Filter Sessions

When two computers communicate using the IP protocol, an IP session is created for the duration of the communication. The Hurricane 9200/S allows a fixed number of concurrent IP sessions. You can view information about each current IP session and delete sessions (for security reasons, for example).

To view all current IP sessions, display the IP Filters Configuration page, and then click Session. The IP Filter Sessions displays:

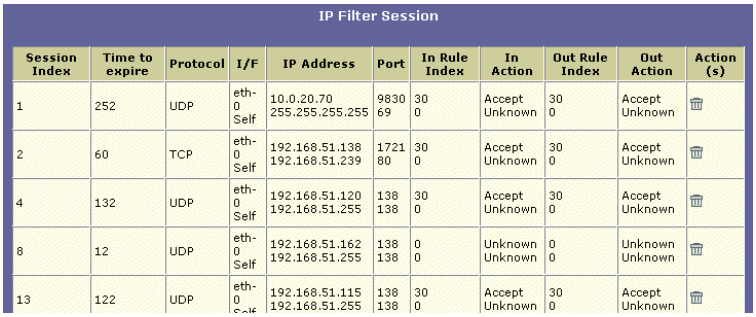

IP Filter Session
Session Index
Time to expire
Protocol
I/F
IP Address
Port
In Rule Index
In Action
Out Rule Index
Out Action
Action (s)
1 252 UDP eth-0 Self 10.0.20.70 255.255.255.255 9830 69 30 0 Accept Unknown 30 0 Accept Unknown
2 60 TCP eth-0 Self 192.168.51.138 192.168.51.239 1721 80 30 0 Accept Unknown 30 0 Accept Unknown
4 132 UDP eth-0 Self 192.168.51.120 192.168.51.255 138 138 30 0 Accept Unknown 30 0 Accept Unknown
8 12 UDP eth-0 Self 192.168.51.162 192.168.51.255 138 138 0 0 Unknown Unknown 0 0 Unknown Unknown
13 122 UDP eth-0 192.168.51.115 192.168.51.255 138 138 30 0 Accept Unknown 30 0 Accept Unknown

***Figure 62. IP Filter Sessions Page***

The IP Filter Session table displays the following fields for each current IP session:

| Field | Description |
|---|---|
| *Session Index* | The ID assigned by the system to the IP session (all sessions, whether or not they are affected by an IP filter rule, are assigned a session index) |
| *Time to expire* | The number of seconds in which the connection will automatically expire |
| *Protocol* | The underlying IP protocol used on the connection, such as TCP, UDP, IGMP, etc.) |
| *I/F* | The interface on which the IP filter rule is effective |
| *IP Address* | The IP addresses involved in the communication. The first one shown is the initiator of the communication. |
| *Port* | The hardware addresses of the ports involved in the communication |
| *In/Out Rule Index* | The number of the IP filter rule that applies to this session (assigned when the rule was created) |
| *In/Out Action* | The action (accept, deny, or unknown), being taken on data coming into or going out from the interface. This action is specified in the rule definition. |
| *Actions* | Provides an icon you can click on (🗑) to delete the IP session. When you delete a session, the communication is discontinued. |

You can click Refresh to display newly accumulated data.

## Configuring Bridge Filters

Bridge filter rules can be created to control the forwarding of incoming and outgoing data between your LAN and the Internet and within your LAN. Bridge filter rules make decisions based on the structure of the "layer 2" data packets (e.g., Ethernet packets) sent or received on the device interfaces, unlike IP filter rules, which are based on the structure of "layer 3" (e.g., IP) packets.

Bridge filtering is also referred to as *raw filtering*.

When the bridge filtering feature is enabled, the bridge/router examines each incoming layer 2 packet and compares it to the bridge filter rules. The bridge filter rules specify which bits of the packet are to be examined, and what criteria those bits must meet in order to qualify as a match for the rule.

When a packet matches a rule, it can either be accepted (forwarded towards its destination), or denied (discarded), depending on the action specified in the rule.

**Note**

*Bridge filters can be used when the unit is configured in either bridge or router mode.*

### Configuring Global Bridge Filter Settings

To display the Bridge Filter Configuration page, click the Services tab, and then click **Bridge Filter** in the task bar.

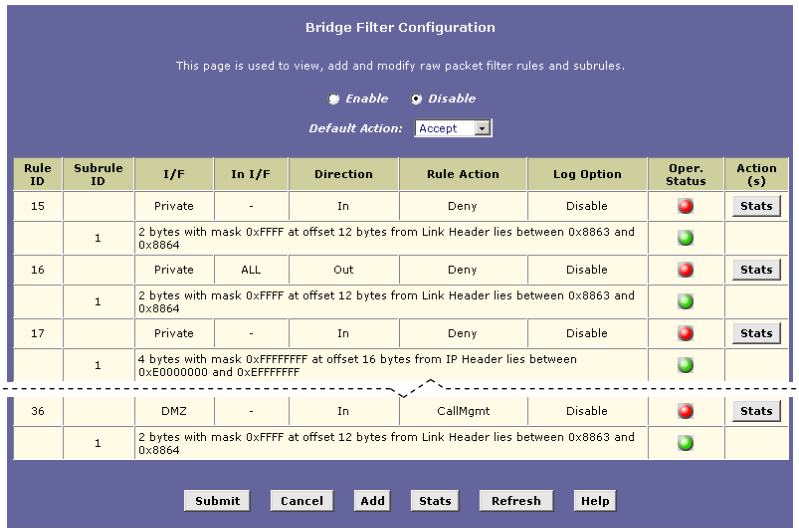



***Figure 63. Bridge Filter Configuration Page***

The Bridge Filter Configuration page displays a table for viewing, adding, and managing rules, and enables you to configure global bridge filter settings. For descriptions of the items in the table, see "Adding Bridge Filter Rules on page 151".

You can also configure the following global settings on this page:

| Field | Description |
|---|---|
| *Enable/Disable* | You can click the Enable and Disable radio buttons to activate/deactivate the service. Although each rule can be independently enabled and disabled, no rules will be effective unless the Enable radio button is selected here. |
| *Default Action* | Your selection in the Default Action drop-down list determines the action to be taken on all packets that do not match a bridge filter rule. The available options are:<br>○ Accept: All packets are accepted on all interfaces — except those specifically denied by a bridge filter rule. (Packets may still be denied due to firewall or IP filter restrictions.)<br>○ Deny: All packets are denied on all interfaces — except those specifically accepted by a bridge filter rule.<br>Do not select CallMgt option — it is for manufacturer use only. |

### Adding Bridge Filter Rules

Adding and enabling a new bridge filter rule is a multi-step process:

- First, you add the rule, which defines general information such as the rule number, the direction of traffic it applies to, and the action to be taken when a match is detected.
- Next, you add one or more subrules, which specify the specific criteria that the bits in the packet must meet. A packet must match the rule criteria and all criteria in its subrules in order for the rule action to taken.
- Finally, you enable the rule and any subrules that you want to be in effect, and then enable the bridge filtering service.

Follow this process to add a rule, then proceed to the next set of steps to add subrules:

1. On the main Bridge Filter page, click **Add** to display the Bridge Filter Rule - Add page:

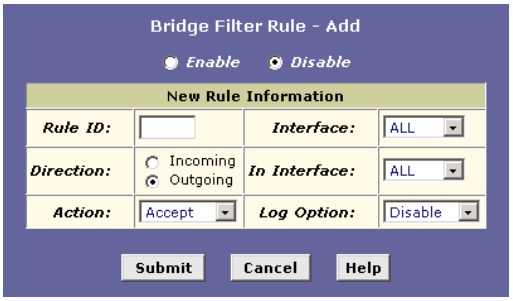



***Figure 64. Bridge Filter Rule – Add Page***

2. Enter or select data for each field that applies to your rule, defined as follows:

| Field | Description |
|---|---|
| *Rule ID* | Each rule must be assigned an ID number. Rules are processed from lowest to highest on each data packet, until a match is found. Rule numbers up to 99 are reserved for preconfigured system rules. Rule IDs must start at 1000 or above so that they do not interfere with system-defined rules. It is also recommended that you assign rule IDs in multiples of 5 or 10 (e.g., 1000, 1010, 1020) so that you leave enough room between them for inserting new rules if necessary. |
| *Interface* | The interface on which the rule will take effect. |
| *Direction* | Specifies whether the rule should apply to packets that are incoming or outgoing on the selected interface. Incoming refers to packets coming in to the LAN on the interface, and Outgoing refers to packets going out from the LAN. You can use rules that specify the incoming direction to restrict external computers from accessing your LAN. |
| *In Interface* | The interface from which packets must be forwarded in order for this rule to be invoked. For example, if the Interface criteria is set to *ppp-0*, then the In Interface could be set to *usb-0*. This specifies that the rule applies only to packets passed from the USB computer through the router's PPP interface. This option is valid only for rules defined for the outgoing direction. |
| *Action* | Specifies what the rule will do to a packet when the packet matches the rule criteria. The action can be Accept (forward to destination) or Deny (discard the packet). Do not select the CallMgt option. |
| *Log Option* | When Enabled is selected, a log entry will be created on the system each time this rule is invoked. Logging may be helpful when troubleshooting. You can also disable logging, log only packets that match rules, or log only packets that do not match rules. This information can be e-mailed to designated administrators. See "Configuring Firewall Settings" on page 135 for instructions. |

3. When you are finished, you can enable the rule by clicking the Enable radio button at the top of the Bridge Filter Rule - Add page.

   Note, however, that a newly created rule, even when enabled, will not have any effect on traffic until at least one subrule has been added and enabled. You can leave the rule disabled for now (the default) and enable it after configuring subrules.

4. Click Submit and then click Close on the confirmation page.

   The Bridge Filter Configuration page displays with the new rule at the bottom of the table.

Now, you can add subrules to specify criteria for the rule:

5. On the Bridge Filter Configuration page, click **Add Subrule** in the Action(s) column of the rule for which you want to created a subrule.

   The Bridge Filter Subrule - Add page displays:

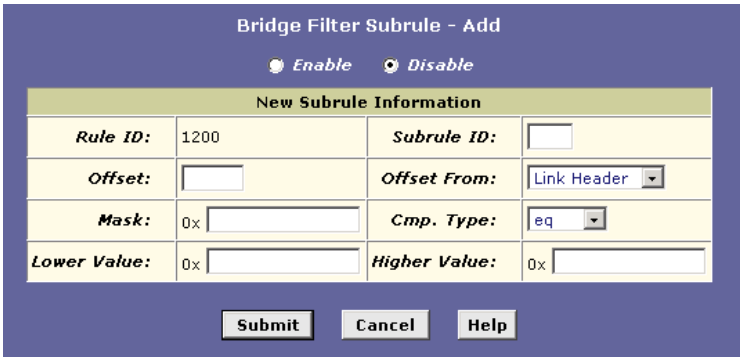



***Figure 65. Bridge Filter Subrule – Add Page***

   The page displays Enable and Disable radio buttons you use to determine whether this sub rule is in effect. A rule will be in effect if the rule itself and at least one of its subrules is enabled.

6. In the New Subrule Information table, specify the criteria for the rule, as follows:

| Field | Description |
|---|---|
| *Subrule ID* | A unique ID number for this subrule. These numbers are independent from the main rule number. The bridge filter processes subrules in sequential order; if a packet fails to match the criteria of any subrule, then the rule will not be invoked and bridge filter processing will continue to the next rule. |
| *Offset* | The number of bits into a packet, starting from a designated location where the subrule comparison should begin. |
| *Offset from* | The location in a Layer 2 packet where the subrule comparison should begin, taking into account any offset bits specified in the previous setting. The comparison can start at the beginning of:<br>○ a Link header (i.e., the start of an Ethernet packet)<br>○ an IP header<br>○ a TCP, UPD, or ICMP header |
| *Mask* | The bits of the packet, specified in hexadecimal, starting at the header and offset location, that should be used when comparing data to this rule. A mask of F0FF, for example, would look only at the 1st, 3rd, and 4th bits from the starting location. |

| Field | Description |
|---|---|
| *Cmp. Type* | Comparison Type - The method for comparing the selected bits, after the mask is applied, to a reference value (or range of values) that you specify (see the next setting). Compared to the reference value, the selected bits can be:<br>○ eq: equal to<br>○ neq: not equal to<br>○ lt: less than<br>○ lteq: less than or equal to<br>○ gt: greater than<br>○ gteq: greater than or equal to<br>○ range: any source IP address that is within the specified range, including its endpoints.<br>○ any: all packets of any type will match this subrule. This selection makes irrelevant any other criteria in the subrule.<br>WARNING: The comparison type any should only be used when all packets of any type are to be accepted or denied. This selection, combined with a rule type that denies matching packets, may disable your access to the Web interface. |
| *Lower Value/Higher Value* | The reference values, in hexadecimal, to which the selected bits will be compared. If range is selected as the comparison type, enter values in both fields; otherwise enter a value only in the Lower Value field. |

7. When you are finished entering criteria and are ready to make this subrule effective, you can click the Enable radio button at the top of the Bridge Filter Subrule - Add page and then click Submit. (You could also leave it disabled and edit the subrule to enable it later.)

   A page displays to confirm your changes.

8. Click Close to return to the Bridge Filter Configuration Page. The subrule should now display in the table beneath the general rule it was added to.

Next, if you have not already done so, you can enable the rule, any of its subrules, and the bridge filtering service in order to make the rule effective.

On the Bridge Filter Configuration page, a red ball displays in the Oper. Status column of the table for rules and subrules that are disabled, and a green ball displays for rules that are enabled. (When creating rules and their subrules, you may have chosen to leave them disabled - the default.)

To make a rule active, enable the following three settings:

- **The Bridge Filter service**: At the top of the Bridge Filter Configuration page, click the Enable radio button.
- **The rule**: On the Bridge Filter Configuration page, click in the Actions column in the row for the rule. On the Bridge

Filter Rule - Modify page, select the Enable radio button and click Submit.

- **At least one subrule**: On the Bridge Filter Configuration page, you can enable a subrule by editing it. Click in the Actions column in the row for the subrule. On the Bridge Filter Subrule - Modify page, select the Enable radio button and click Submit.

If a rule is enabled but none of its subrules are enabled, then the rule will have no effect on network traffic. A rule can be in effect, however, when some of its subrules are disabled.

If want your changes to be permanent, be sure to commit them (see "Committing Changes" on page 45).

### Bridge Filter Rule Example

The following instructions create a rule for preventing Telnet access to the device from a specific WAN interface:

1. Add rule #100 with the following settings:
   - Interface: ppp-0
   - Direction: Incoming
   - Action: Accept
2. Click the Enable radio button at the top of the Bridge Filter Rule - Add page, and then click Submit.
3. Add subrule #1 with the following settings:
   - Offset = 2
   - Offset from = TCP Header
   - Mask = 0x0FFF
   - Cmp Type = eq
   - Lower Value = 0x0017

     (The hexadecimal number *0x0017* is binary port number *23*, the well-known port number for Telnet packets.)
4. Click the Enable radio button at the top of the Bridge Filter Subrule - Add page, and then click Submit.
5. If necessary, enable the Bridge Filter Service by clicking the Enable radio button at the top of the Bridge Filter Configuration page.

All TCP packets incoming on the ppp-0 interface will now be dropped.

### Editing and Deleting Rules and Subrules

In the table on the Bridge Filter Rule page, the following items display in the Actions column for each rule and subrule:

| Button | Description |
|---|---|
| | Edits the rule or subrule. The Bridge Filter Rule - Modify or Bridge Filter Subrule - Modify page displays. See Adding Bridge Filter Rules for a description of the items on these pages. |
| | Deletes the rule or subrule. Before deleting a rule, you must first delete all of its subrules. A page displays to enable you to confirm or cancel the deletion. |

The above icons do not display for rules that are preconfigured by the ISP; these rules and related statistics can be viewed but not otherwise accessed via the Web-based interface.

### Viewing Rule Statistics

You can view statistics for each rule and total statistics for all rules:

- To view statistics for an individual rule, click Stats in the corresponding Action(s) column on the Bridge Filter Configuration page. The Bridge Filter Rule - Stats page reports the accumulated number of packets that have been received that match this rule.
- To view the total number of packets received that match any of the rules, click Stats at the bottom of the Bridge Filter Configuration page. The Bridge - Filter Rule Stats page, which shows the number of packets that have been received that match any of the rules.

On either page, you can click Clear to reset the count to zero and Refresh to display newly accumulated data.

## Blocking Protocols

The Blocked Protocols feature enables you to prevent the ADSL/Ethernet router from passing any data that uses a particular protocol. Unlike the IP filter feature, you cannot specify additional criteria for blocked protocols, such as particular users or destinations. However, when you are certain that a particular protocol is not needed or wanted on your network, this feature provides a convenient way to discard such data before it is passed.

To display the Blocked Protocols page, click the Services tab, and then click **Blocked Protocols** in the task bar. The Blocked Protocols page displays:

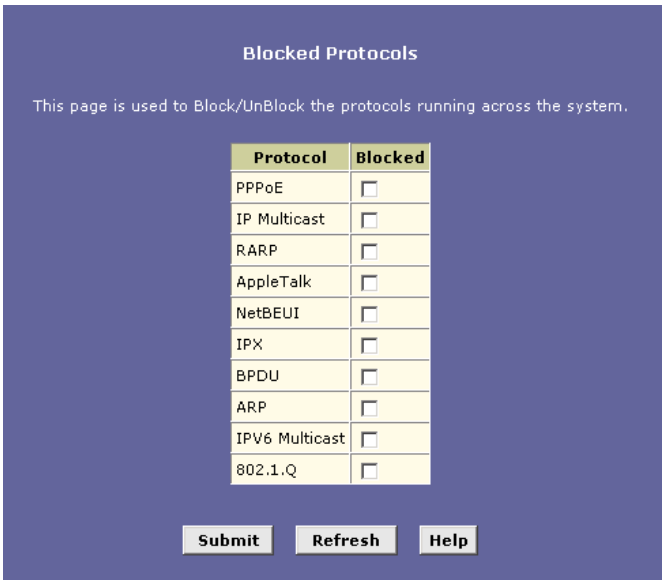



***Figure 66. Blocked Protocols Page***

**WARNING**

*Blocking certain protocols may disrupt or disable your network communication or Internet access. If you are unfamiliar with how your network or Internet connection uses these protocols, contact your ISP before disabling.*

The following list describes each of the available protocols.

| Protocol | Description |
|---|---|
| *PPoE* | Point-to-Point Protocol over Ethernet. Many DSL modems use PPoE to establish and maintain a connection with a service provider. PPoE provides a means of logging in to the ISPs servers so that they can authenticate you as a customer and provide you access to the Internet. Check with your ISP before blocking this protocol. |

| Protocol | Description |
|---|---|
| *IP Multicast* | IP Multicast is an extension to the IP protocol. It enables individual packets to be sent to multiple hosts on the Internet, and is often used for handling e-mail mailing lists and teleconferencing/videoconferencing. |
| *RARP* | Reverse Address Resolution Protocol. This IP protocol provides a way for computers to determine their own IP addresses when they only know their hardware address (i.e., MAC addresses). Certain types of computers, such as diskless workstations, must use RARP to determine their IP address before communicating with other network devices. |
| *AppleTalk®* | A networking protocol used in for Apple Macintosh® networks. |
| *NetBEUI* | NetBIOS Enhanced User Interface. On many LAN operating systems, the NetBEUI protocol provides the method by which computers identify themselves to and communicate with each other. |
| *IPX* | Internetwork Packet Exchange. A networking protocol used on Novell Netware®-based LANs. |
| *BPDU* | Bridge Protocol Data Unit. BPDUs are data messages that are exchanged across the switches between LANs that are connected by a bridge. BPDU packets contain information on ports, addresses, priorities, and costs, and are exchanged across bridges to detect and eliminate loops in a network. |
| *ARP* | Address Resolution Protocol. Computers on a LAN use ARP to learn the hardware addresses (i.e., MAC addresses) of other computers when they know only their IP addresses. |
| *IPV6 Multicast* | IP Multicasting under IP Protocol version 6. See *IP Multicast* above. |
| *802.1.Q* | This IEEE specification defines a protocol for *virtual LANs* on Ethernet networks. A virtual LAN is a group of PCs that function as a local area network, even though the PCs may not be physically connected. They are commonly used to facilitate administration of large networks. |

To block a protocol, click the appropriate check box, and click Submit. After you have verified that the device continues to function as expected, if you want the changes to be permanent, follow the instructions on page 45 to commit them.

# *Part 5*

## *Administrative Tasks and System Monitoring*

# About Part 5

Part 5 describes tools that LAN administrator can use to monitor the system performance and control access to the Configuration Manager program.

Part 5 contains the following chapters:

- **Chapter 15, "Managing Access,"** describes how to manage user IDs and passwords for logging in to Configuration Manager and how to enable your ISP to configure the device remotely.
- **Chapter 16, "Monitoring System Status and Performing Diagnostics,"** describes how to view information on system events and DSL line performance, how to run the diagnostic utility to troubleshoot system problems, and how to use the ping and traceroute utilities.
- **Chapter 17, "Upgrading the Software,"** explains how to upgrade the system by uploading new software files.
- **Chapter 18, "Modifying Port Settings,"** describes how to change the Port ID numbers associated with the embedded Web, FTP, and Telnet servers.
- **Chapter 19, "Configuring Autodetect,"** describes how to configure the Autodetect service, which enables the modem to automatically detect and configure a valid ATM VC at startup.

# 15 Managing Access to the Configuration Program

This chapter describes how to manage access to the Configuration Manager program, including creating user logins and passwords and enabling or disabling external access through the WAN port.

## Managing User Logins

The Hurricane 9200/S is configured with a default user name and password combination, or login, for accessing Configuration Manager. If you want to allow other users to access the program, you can create additional user logins and specify their privilege levels. You can also change the password for the default login or for any logins you create.

The default login allows the user full access to all Configuration Manager features, including creating up to four additional user logins. You can assign one of the following privilege levels to each additional login:

- *Root-level* privileges enable users to modify all the features available in Configuration Manager. The default login has root-level privileges.
- *Intermediate-level* privileges enable users to change their own passwords. They can also change the PPP interface username and password, and the ATM VC interface values. (Note, however, that Intermediate users can change these only on the PPP and ATM VC pages – not on the Quick Configuration page.) These users can view—but not create or modify— all other system information.
- *User-level* privileges enable users to change their own passwords. They can view—but not create or modify— all other system information.

To create additional logins or modify existing logins, follow these instructions:

1. Log into Configuration Manager using the default user name and password, and then click the Admin tab.

   The User Configuration page displays by default:

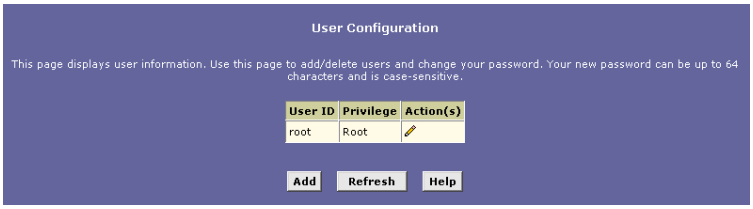



***Figure 67. User Configuration Page***

2. Click Add to display the User Config-Add page:

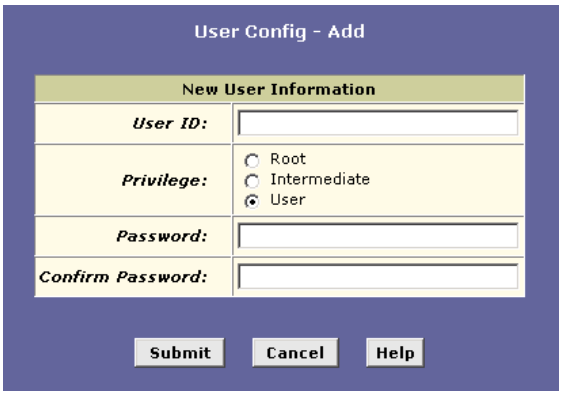



***Figure 68. User Config-Add Page***

3. Type the User ID and Password in the text boxes provided, and then select the privilege level for this user, as described on 161.

   The user name can be up to 128 characters, but cannot contain spaces or special characters.

   The password can also be up to 128 characters. Be sure to retype the password in the Confirm Password text box, exactly as before, including lowercase and uppercase characters.

4. Click Submit.

5. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

You cannot change or delete the default login. To delete a subsequently created login, click in the corresponding Action(s) column in the table on the User Configuration page.

## Changing Login Passwords

Users of all privilege levels can modify their own password. Only users with Root privileges can modify other users' passwords. Follow these instructions to change a login password.

**Note**

*This user ID and password are used only for logging into the Configuration Manager; it is not the same as the PPP login you may use to connect to your ISP (described in Chapter 5).*

1. From the User Configuration page, click ✎ next to the login whose password you want to modify.

   The User Config-Modify page displays:

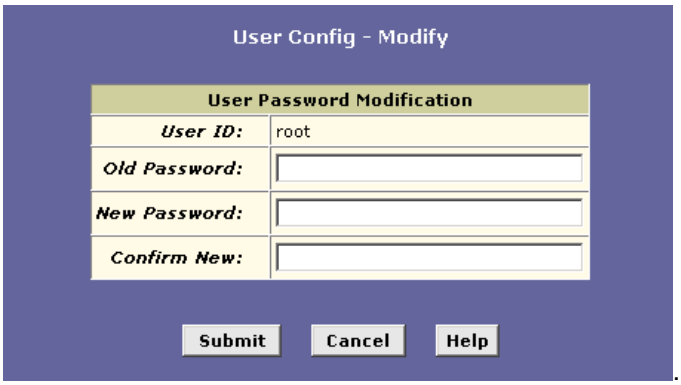



***Figure 69. User Config-Modify Page***

2. Type your current password in the Old Password text box.
3. Type your new password in both the New Password and Confirm New text boxes.

   The password can be up to 128 ASCII characters long. When logging in, you must type the new password in the same uppercase and lowercase characters that you use here.

4. Click Submit.
5. If you want the changes to be permanent, follow the instructions on page 45 to commit them.

## Enabling Management through the WAN Port

You can enable access to Configuration Manager via the WAN port so that the ISP can perform configuration tasks.

To enable WAN access, display the Management Control page by clicking **Management Control** in the Admin tab.

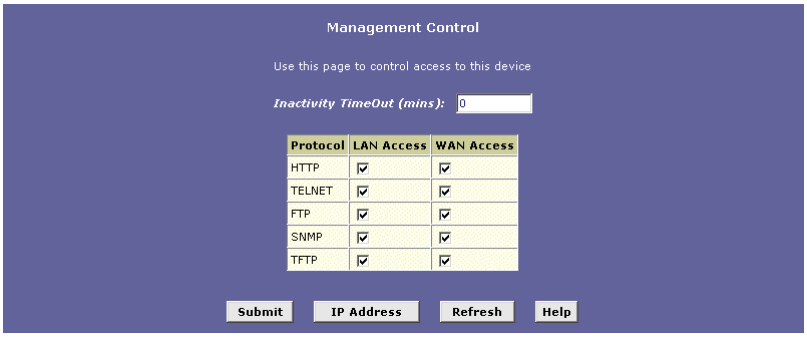



***Figure 70. Management Control Page***

The table on this page provides a check box to enable or disable HTTP (i.e., Web browser-based) access to the configuration program through the WAN port. In the Inactivity TimeOut text box, you can specify a length of time in minutes after which external access will be blocked, assuming that there is no access during that time.

If you want your changes to be in effect the next time you log in, click Submit.

If you want the changes to be permanent, follow the instructions on page 45 to commit them.

## Configuring SNMP

The Simple Network Management Protocol (SNMP) enables a host computer to access configuration, performance, and other system data that resides in a database on the modem. The host computer is called a *management station* and the modem is called an *SNMP agent*. The data that can be accessed via SNMP is stored in a Management Information Database (or *MIB*) on the modem.

When SNMP is enabled, the modem responds to SNMP requests from the host. The host may ask to read data from the MIB or, when its privileges allow, write data to it.

Privilege levels are defined by the SNMP *communities* configured on the modem. A community is a named group of IP addresses. These addresses identify the hosts that are permitted to act as SNMP management stations for accessing the MIB. Each community is defined as having either read-only or read/write privileges.

The data stored in the MIB includes the standard items defined for the SNMP protocol and custom items defined by the ISP. The MIB contents are preconfigured by the ISP and cannot be managed via the Web-based interface.

A complete SNMP setup includes the following items:

- A management station equipped with an SNMP manager client that enables sending messages to an SNMP agent (e.g., the modem). This configuration is not described here.
- A MIB stored in the modem's memory. This must be preconfigured in the software image by the ISP.
- The SNMP service enabled on the modem, including defined communities that allow read-only or read/write accesses from specific hosts. This configuration is described below.

### Creating Communities

1. Log into Configuration Manager, click the Admin tab, and then click **SNMP Config** in the task bar.

   The SNMP Configuration page displays:

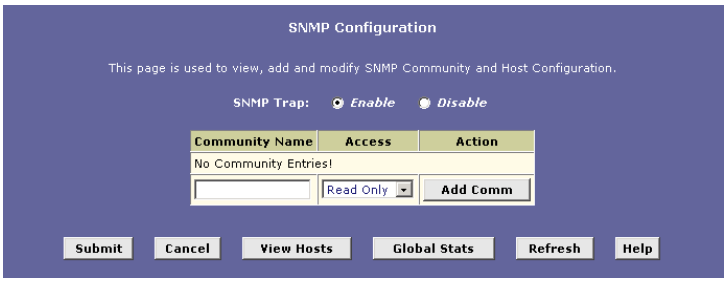



***Figure 71. SNMP Configuration***

2. On the SNMP Configuration page, type a community name in the empty text box in the left column of the table.

3. From the Access column of the table, select the privileges (Read-Only or Read/Write) to assign to all hosts that are part of this community.
4. Click Add Comm.

   A page displays briefly to confirm your changes, and then the SNMP Configuration page redisplays with the new entry.

Now, you can add hosts to the new community:

### Adding Hosts to Communities

1. In the Action column, click Add Host.

   The SNMP - Add Host page displays in a separate window:

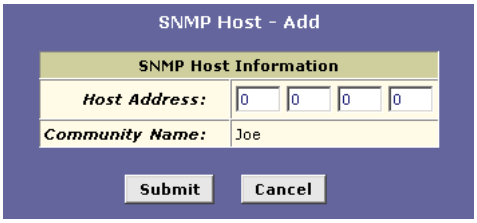



***Figure 72. SNMP Host – Add Page***

2. Enter the IP address of the host computer you want to add and click Submit.

   A page displays briefly to confirm the addition, and the SNMP - Add Host page redisplays.
3. Continue adding hosts as required and click Submit when done.

The newly added hosts now have access to the MIB with the privilege level associated with the community.

### Viewing Hosts

To view all hosts and the communities to which they are assigned, click View Hosts on the main SNMP Configuration page.

### Viewing Global SNMP Statistics

To view statistics relating to SNMP packets received and sent and packet errors, click Global Stats on the main SNMP Configuration page. The SNMP Global Statistics page shows the number and type of packets transmitted.

# 16 Monitoring System Status and Performing Diagnostics

This chapter shows you where to find information related to system events (alarms) and DSL line performance, and how to run a diagnostic program to troubleshoot problems.

## Viewing System Alarms

You can use the Configuration Manager to view information about alarms that occur in the system. Alarms, also called traps, are caused by a variety of system events, including connection attempts, resets, and configuration changes. This information may be helpful in working with your ISP to troubleshoot problems you encounter with the device. (Despite their name, not all alarms indicate problems in the functioning of the system.)

### Viewing the Alarm Table

To display the Alarm page, log into the Configuration Manager, click the Admin tab, and then click **Alarm** in the task bar. The Alarm page is shown in Figure 73.

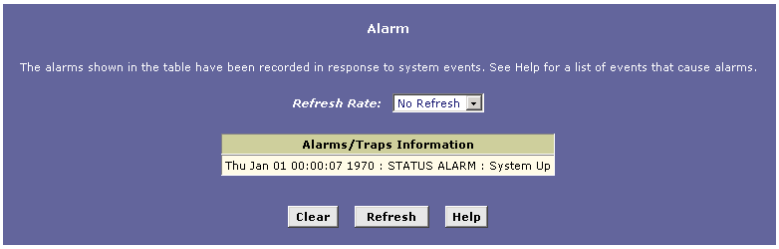

Alarm
The alarms shown in the table have been recorded in response to system events. See Help for a list of events that cause alarms.
Refresh Rate:
No Refresh
Alarms/Traps Information
Thu Jan 01 00:00:07 1970 : STATUS ALARM : System Up
Clear
Refresh
Help

***Figure 73. Alarm Page***

Each row in the table displays the time and date that an alarm occurred, the type of alarm, and a brief statement indicating its cause.

You can click on the Refresh Rate drop-down list to select a recurring time interval after which the page will redisplay with new data.

You can click Save Alarm to display a Windows File Download dialog box that enables opening or saving the contents of the log to your PC. The file is assigned the default name *alarm.vlf*, and can be viewed with any text editor.

To remove all entries from the list, click Clear. New entries will begin accumulating and will display when you click Refresh.

## Viewing the System Log

You can view data generated or acquired by routine system communication with other devices, such as the results of negotiations with the ISP's computers for DNS and gateway IP addresses. This information does not necessarily represent unexpected or improper functioning and is not captured by the system traps that create alarms.

This information accumulates and displays in a system log window. To view the system log, click the Admin tab, and then click **System Log** in the task bar.

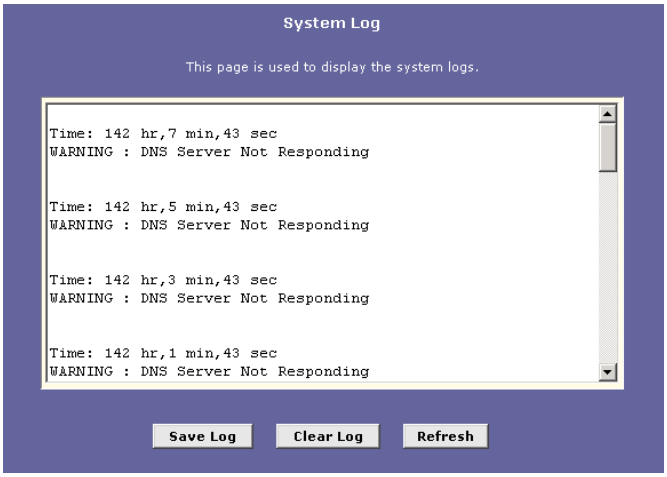

System Log
This page is used to display the system logs.
Time: 142 hr,7 min,43 sec
WARNING : DNS Server Not Responding
Time: 142 hr,5 min,43 sec
WARNING : DNS Server Not Responding
Time: 142 hr,3 min,43 sec
WARNING : DNS Server Not Responding
Time: 142 hr,1 min,43 sec
WARNING : DNS Server Not Responding
Save Log
Clear Log
Refresh

***Figure 74. System Log page***

You can click to display a Windows File Download dialog box that enables opening or saving the contents of the log to your PC. The file is assigned the default name *syslog.vlf*, and can be viewed with any text editor.

## Viewing DSL Information

To view configuration parameters and performance statistics for the Hurricane 9200/S's DSL line, log into Configuration Manager, and then click the WAN tab. The DSL Status page displays by default:

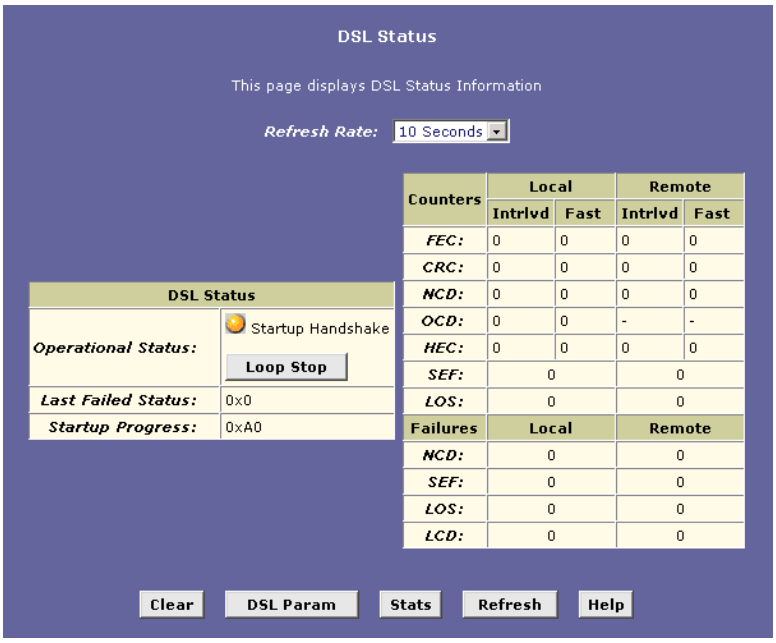



***Figure 75. DSL Status Page***

***Figure 76 DSL Status Page***

The DSL Status page displays current information on the DSL line performance. The page refreshes according to the setting in the Refresh drop-down list, which you can configure.

In the DSL Status table, the Operational Status setting displays a red, orange, or green ball to indicate that the DSL line is idle, starting up, or up-and-running, respectively. You can click **Stop** to end the DSL connection or Stop DELT. To restart the connection, you can click **Start**. To start DELT you need to select Delt from drop down menu and click **Start**.

Although you generally will not need to view the remaining data, it may be helpful when troubleshooting connection or performance problems with your ISP.

You can click **Clear** to reset all counters to zero. You will not be able to clear Counter if connected standard is of ADSl2/2+ category.

Click **Refresh** to redisplay the page with newly accumulated values.

You can click **DSL Param** to display the DSL Parameters page, which provides data about the configuration of the DSL line:

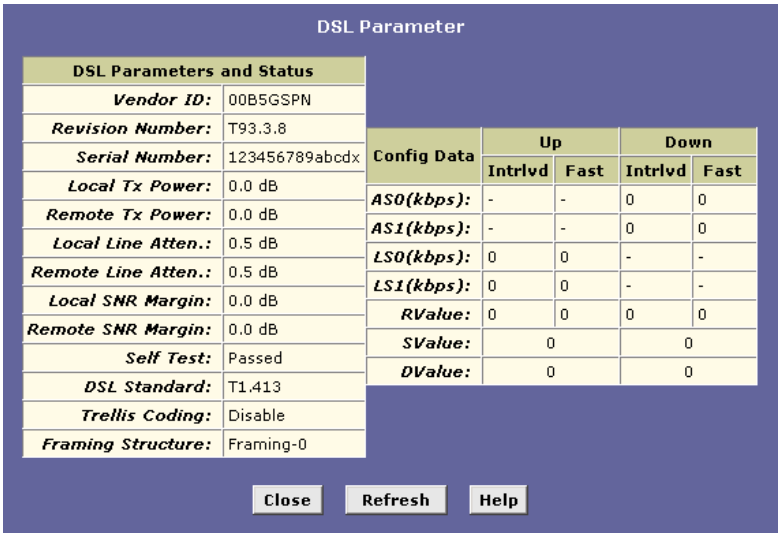
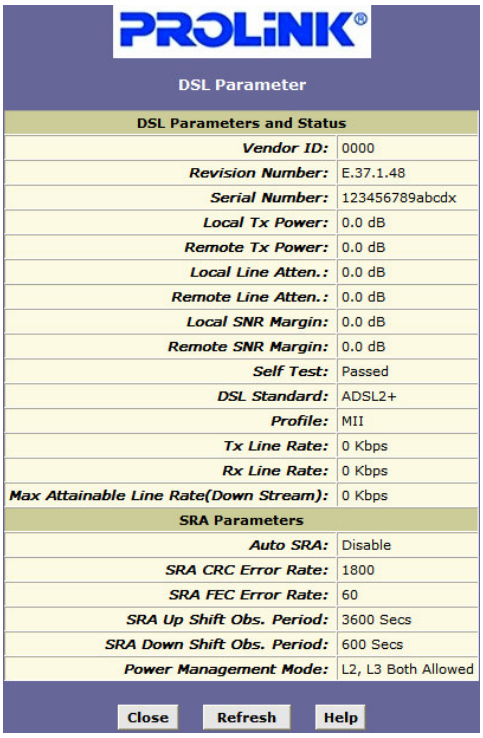



***Figure 77. DSL Parameters Page***




***DSL Parameters Page***

- The DSL Parameters and Status table displays settings preconfigured by the product manufacturer or your ISP.
- The Config Data table lists various types of error and defects measurements found on the DSL line.

You cannot modify this data.

From the DSL Status page, you can also click **Stats** to display DSL line performance statistics.

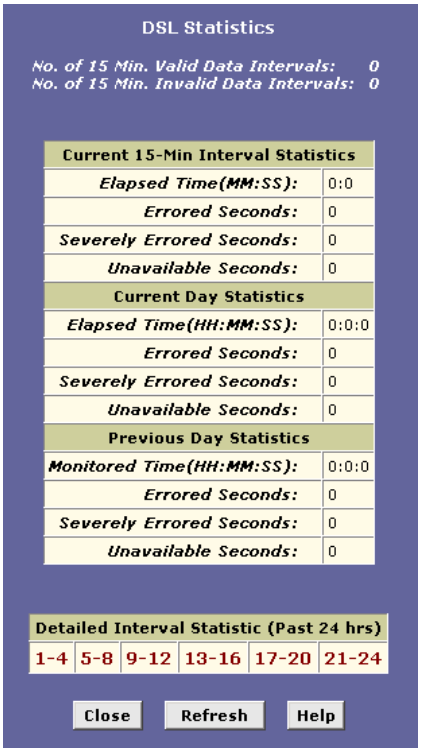



***Figure 78. DSL Statistics Page***

The DSL Statistics page reports error data relating to the last 15-minute interval, the current day, and the previous day.

At the bottom of the page, the Detailed Interval Statistic table displays links you can click on to display detailed data for each 15-minute interval in the past 24 hours. For example, when you click on 1-4, data displays for the 16 intervals (15-minutes each) that make up the previous 4 hours. Figure 79 shows an example.

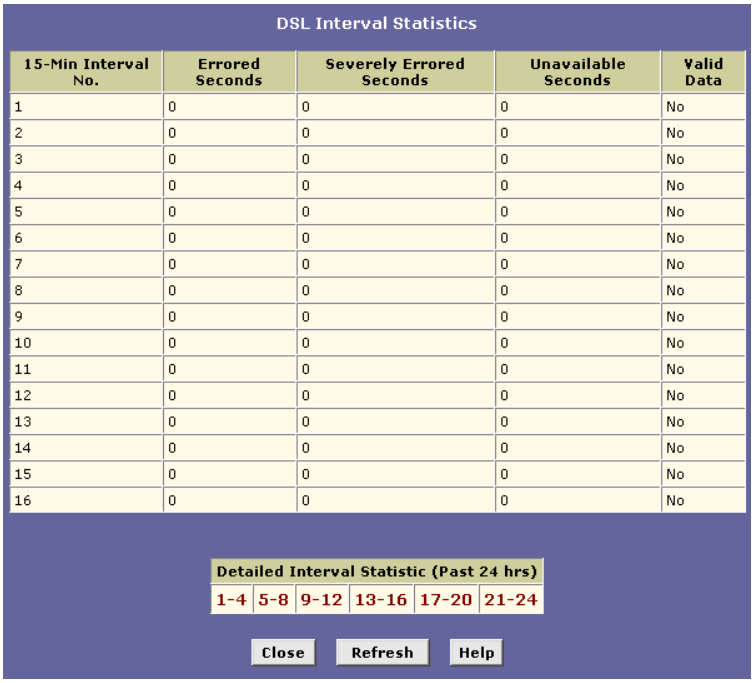

DSL Interval Statistics
15-Min Interval No.
Errored Seconds
Severely Errored Seconds
Unavailable Seconds
Valid Data
1 0 0 0 No
2 0 0 0 No
3 0 0 0 No
4 0 0 0 No
5 0 0 0 No
6 0 0 0 No
7 0 0 0 No
8 0 0 0 No
9 0 0 0 No
10 0 0 0 No
11 0 0 0 No
12 0 0 0 No
13 0 0 0 No
14 0 0 0 No
15 0 0 0 No
16 0 0 0 No
Detailed Interval Statistic (Past 24 hrs)
1-4 5-8 9-12 13-16 17-20 21-24
Close
Refresh
Help

***Figure 79. DSL Interval Statistics Page***

## Using Diagnostics

The diagnostics feature executes a series of test of your system software and hardware connections. Use this feature when working with your ISP to troubleshoot problems.

### Running the Diagnostics Program

Follow these instructions to begin the diagnostics program:

1. Log into Configuration Manager, click the Admin tab, and then click **Diagnostics** in the task bar.

   The Diagnostics page displays.

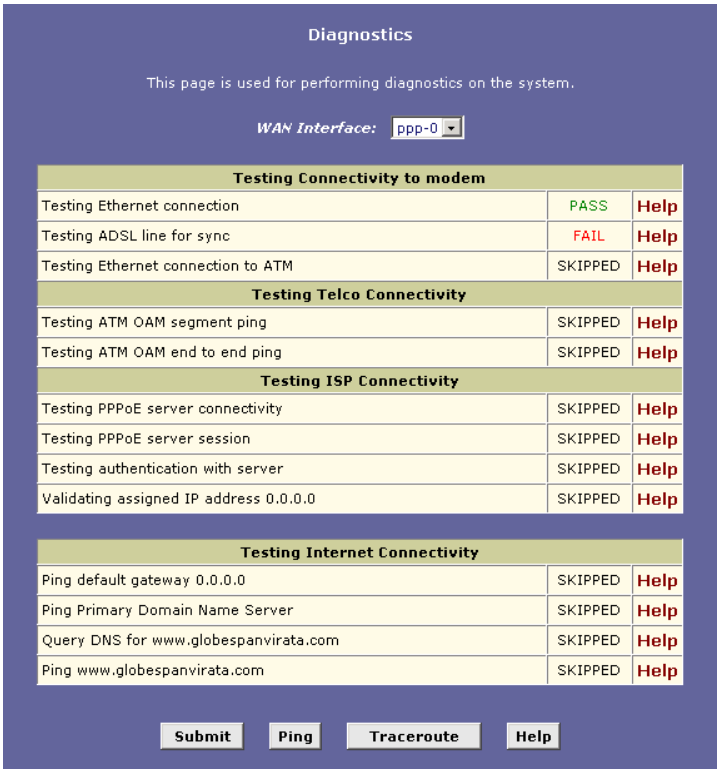

Diagnostics
This page is used for performing diagnostics on the system.
WAN Interface: ppp-0
Testing Connectivity to modem
Testing Ethernet connection PASS Help
Testing ADSL line for sync FAIL Help
Testing Ethernet connection to ATM SKIPPED Help
Testing Telco Connectivity
Testing ATM OAM segment ping SKIPPED Help
Testing ATM OAM end to end ping SKIPPED Help
Testing ISP Connectivity
Testing PPPoE server connectivity SKIPPED Help
Testing PPPoE server session SKIPPED Help
Testing authentication with server SKIPPED Help
Validating assigned IP address 0.0.0.0 SKIPPED Help
Testing Internet Connectivity
Ping default gateway 0.0.0.0 SKIPPED Help
Ping Primary Domain Name Server SKIPPED Help
Query DNS for www.globespanvirata.com SKIPPED Help
Ping www.globespanvirata.com SKIPPED Help
Submit
Ping
Traceroute
Help

***Figure 80. Diagnostics Page***

2. From the WAN Interface drop-down list, select the name of the WAN interface you want to test.
3. Click **Submit**.

The diagnostics utility runs a series of test to check whether the device's connections are up and working. This takes only a few seconds and the results for each test are displayed on screen (*Pass*, *Fail*, or *Skipped*). A test may be skipped if the program determines that no suitable interface is configured on which to run the test.

You can click **Help** to display an explanation of each test. Work with your ISP to interpret the results of the diagnostic tests.

### Using the Ping Utility

*Ping* is a command you can use to check whether your PC can recognize other computers on your network and the Internet. A ping command sends a message to the computer you specify. If the computer receives the message, it sends messages in reply. To use ping, you must know the IP address or domain name of the computer you want to communicate with.

For example, you can test whether the path to the ISP is working if you know the IP address of their access server.

The Diagnostics page provides a utility for executing ping. Follow these steps:

1. Display the WAN tab, click **Diagnostics** in the task bar, and click Ping at the bottom of the Diagnostics page.

   The Diagnostics - Ping page displays:

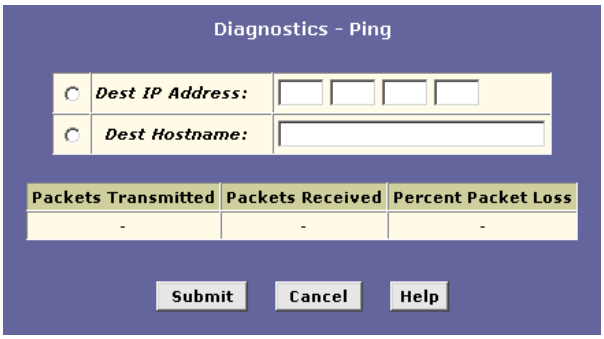



   ***Figure 81. Diagnostics – Ping Page***

2. In the Dest IP Address text boxes, type the IP address of the computer you want to ping.

   Or, in the Dest Hostname text box, type the domain name of the target site (such as *yahoo.com* or *mydomain.net*).

3. Click Submit.

   In a few seconds, the lower table will display values indicating the results after 4 ping packets have been transmitted. If a connection is detected, the Packets Received value will also equal 4. If no connection can be detected after 4 attempts, then the Packets Received value will be 0 and the Percent Packet Loss will be 100%.

### Using the Traceroute Utility

You can use the traceroute utility to view the IP addresses of all the hops that an IP packet makes from the Hurricane 9200/S on its way to an Internet destination. You can use the results of a traceroute to determine where a delay or transmission error is occurring.

The traceroute utility sends a specified number of ping or UDP packets (3, by default) to the first router in the path toward the specified destination computer. These packets carry a time-to-live (TTL) value of 1. The TTL value is a counter which is reduced by 1 by each router that receives the packet. The first receiving router reduces the TTL from 1 to 0 and responds with an ICMP message indicating that the packet has been discarded. The receipt of this message enables the Hurricane 9200/S to determine:

- that the ping/UDP packets reached the initial router, and
- the packet's approximate time in transit.

The traceroute utility then sends out packets with a TTL of 2. The First router that receives the packet reduces the TTL to 1 and routes the packet to the next hop. The second router that receives the packet reduces the TTL to 0 and responds with an ICMP timeout reply. The next set of traceroute packets has a TTL of 3, and so on, until the traceroute packets reach the destination computer. The destination computer replies with an error message that signals the completion of the traceroute.

To perform a traceroute, you must know the destination IP address or host name. Follow these steps to perform a traceroute:

1. From the Diagnostics page, click **Traceroute**.

   The Diagnostic – Traceroute page displays:

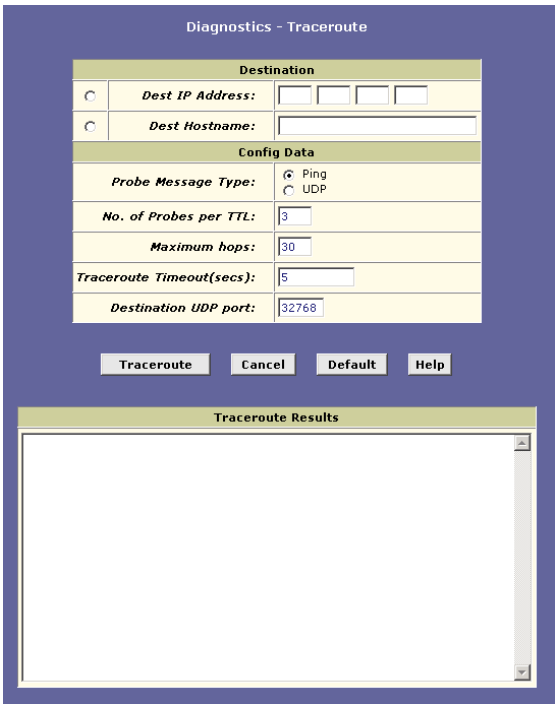



***Figure 82. Diagnostics Page - Traceroute***

2. Click either the Destination IP Address or Dest Hostname radio button, and then type the appropriate data in the corresponding text box.

   The destination host name must be in the form of a fully qualified domain name, such as *yahoo.com*.

3. In the Config Data section, change any of the following parameters, as needed:

| Field | Description |
|---|---|
| *Probe Message Type* | The traceroute can use ping/UDP messages to conduct the traceroute. Some routers in the path may not support one or the other method. Try one, and if not working, try the other. |
| *No. of Probes per TTL* | The number of redundant packets that will be sent in each transmission (to account for packets dropped due to connection or server problems). |
| *Maximum hops* | The maximum number of hops that can be discovered in a traceroute before it terminates. |
| *Traceroute Timeout (secs)* | The number of seconds after sending ping/UDP packets that the traceroute will timeout if no reply is received. |
| *Destination UDP port* | When the Probe Message Type is specified as *UDP*, the traceroute commands includes an invalid destination UDP port address in the UDP packets. When a packet reaches the destination, it is dropped and the computer replies with an error message. This error message is used to identify the completion of the traceroute.<br>This field specifies the invalid UDP port number to use. This field is not used if the Probe Message Type is *ping*. |

4. Click

to begin the trace.

   The results display in the window at the bottom of the page and include the IP address of each router or computer reached, from the first to last hop, and the access time for each packet sent.

# 17 Upgrading the Software and Storing and Restoring the Configuration Data

All system software is contained in a single file, called an *image*. The image is stored in system flash memory and contains the operating system, device drivers, application code, and configuration data. The configuration data includes all the customizable settings described in this User's Guide.

You can upgrade the image by installing a new one provided by your ISP. You can also save the current configuration data to a file, which you can later restore to system flash.

## Upgrading the Image

Your ISP may from time to time notify you that a software upgrade is available. Upgrade files may be provided to you in two ways:

- On a CD-ROM or other media. You can use Configuration Manager to upload the file from the CD-ROM drive or your PC's hard drive (or shared network drive) to system flash.
- On remote ISP server. You can use Configuration Manager download the file and load it to system flash.

### Upgrading Using an Image Stored Locally

Follow this procedure if you have obtained an updated image from your ISP and stored the file on your PC, CD-ROM, or other media.

1. Insert the media containing the file in your PC's CD-ROM/disk drive. You can access the file from there or copy it to your hard drive or to any shared network drive.

   The name of the upgrade file must be either *TEImage*.bin* or *TEPatch*.bin*, where * represents any number of characters.

2. Log into Configuration Manager, click the Admin tab, and then click **Local Image Upgrade** in the task bar.

   The Local Image Upgrade page displays.

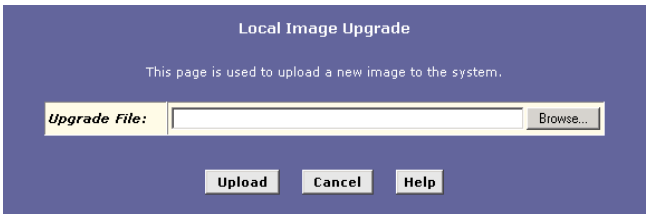



***Figure 83. Local Image Upgrade Page***

3. In the Upgrade File text box, type the path and file name of the file. You can click Browse... to search for it.

4. Select the file, and then click Upload.

   The following message box displays at the bottom of the page:

   **Loading New Software**
   Please do not interrupt the upgrade process. A status page will appear automatically when loading is completed (about 1 minute).

   When loading is complete, the following message displays (the file name may differ):

   File: TEImage.bin successfully saved to flash. Please reboot for the new image to take effect.

5. Turn off power to the unit, wait a few seconds, and turn it on again.

The new software will now be in effect. If the system fails to boot or is not working properly, contact your ISP for assistance.

### Uploading an Image Stored Remotely

Follow this procedure if the upgrade file is available by downloading from your ISP. Contact your ISP to obtain the server and logon information required.

1. Log into Configuration Manager, click the Admin tab, and then click **Remote Image Upgrade** in the task bar.

   The Remote Image Upgrade page displays.

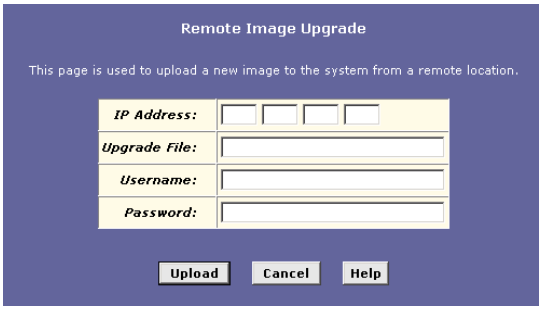



***Figure 84. Remote Image Upgrade Page***

Note

*If the page does not display a table as shown in Figure 84, but displays only the Upload button, skip to step 5. In this case, the download server IP address, filename, and logon information has already been hard-coded into your system.*

2. In the IP Address text boxes, type the IP address of the server from which the file is to be downloaded.
3. In the Upgrade File text box, type the complete name of the file to be downloaded and installed.

   The file name can be either TEImage*.bin or TEPatch*.bin, where * represents any number of characters.

4. In the Username and Password fields, type the logon information to the ISP's server (if the ISP requires it).

5. Click Upload.

   An alert window pops up displaying the following message:

   Image upgrade may take a few minutes after which the system will reboot.

6. Click OK to start the image upgrade.

   The file begins downloading from the ISP's server and loading the image into flash. When image upgrade is complete, the following message displays:

   Remote Image Upgrade Successful...

   The system will proceed to reboot itself automatically. Wait 1 minute to allow the reboot to complete. You must refresh your browser and log in again if you want to continue using Configuration Manager.

## Storing and Restoring Configuration Settings

Many of the Hurricane 9200/S's software features, such as those documented in this User's Guide, can be configured in various ways to address your needs or your ISP's requirements. This configuration data becomes part of the software image. You can extract configuration data from the software image and save it on your PC as a text file. If you later change the system configuration, but then want to revert to the previous settings, you can load the configuration file back to the system.

This feature may be especially useful when you receive an image upgrade file from your ISP containing software updates. Uploading the new image may overwrite your customized settings with default values. Before you load the new image, you can store the configuration settings. Then, after you load the image, you can restore your previous configuration.

Follow these instructions to save and restore the configuration file:

1. Ensure that any changes you have made in the current session have been committed (click the Admin tab, click **Commit & Reboot** in the task bar, and then click Commit.)

2. In the Admin tab, click **Backup/Restore Config** in the task bar.

   The Backup/Restore Config page displays:

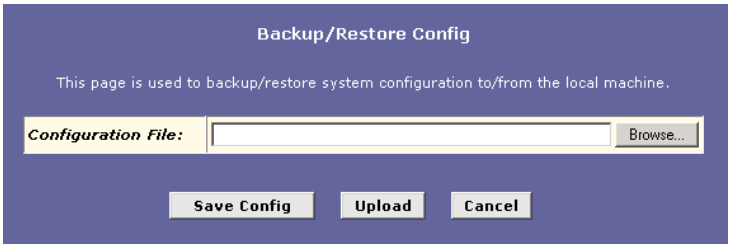



***Figure 85. Backup/Restore Config Page***

3. Perform either of the following:

- To save the current configuration, click **Save Config**.

  A Windows dialog box will display to enable you to choose where to save the file. The file is named *commitedcfg.cfg* and can be opened with any text editor.

  You can change the file name to identify the date or characteristics of the configuration; however, you must change it back to *commitedcfg.cfg* before restoring it.

- To restore a saved configuration file, click **Browse...**.

  A Windows dialog box will display to enable you to select the file, which must be named *commitedcfg.cfg*, from your PC or network. Double-click the file and then click **Upload**. The following message displays while the file is being uploaded:

  **Loading New Software**
  Please do not interrupt the upgrade process. The system will reboot soon.
  Please open a new browser window to continue browsing.

  When the system reboots, your connection to the Configuration Manager will be suspended and may appear to hang. If you want to continue to use Configuration Manager, wait about 30 seconds and Refresh the browser window (e.g., press **<F5>** if using Internet Explorer). You may need to log in again.

# 18 Modifying Port Settings

This chapter describes how to modify the Port ID numbers associated with the Hurricane 9200/S's Web, FTP, and Telnet servers.

## Overview of IP port numbers

The header information in an IP data packet specifies a destination port number. Routers use the port number along with the IP addresses to forward the packet to its intended recipient.

For example, all IP data packets that the ADSL/Ethernet router receives from the Internet specify the same IP address (your public IP address) as the destination. However, depending on the port number contained in a data packets, the ADSL/Ethernet router may pass the packet on to its embedded Web or Telnet servers, or to another computer on the network.

The Internet community has developed a list of common server types such as HTTP, Telnet, e-mail, and many others, and has defined port numbers that can be assigned each. This is not a mandatory scheme, but is useful in promoting communication between separately administered LANs.

## Modifying the Hurricane 9200/S's Port Numbers

In some cases, you may want to assign non-standard port numbers to the HTTP and Telnet servers that are embedded on the Hurricane 9200/S. The following scenario is one example in which changing the HTTP port number may be necessary:

> You have an externally visible Web server on your LAN, with a NAT rule (RDR flavor) that redirects incoming HTTP packets to that Web server. When incoming packets contain a destination IP address of your public IP address (which is assigned to the ADSL/Ethernet router's WAN interface) and the standard Web server port number of 80, the NAT rule recognizes the port number and redirects the packets to your Web server's local IP address.
>
> Assume in this scenario that you also want to enable external access to the Hurricane 9200/S's Configuration Manager, so that your ISP can log in and manager your system, for example. Accessing Configuration Manager requires accessing the Hurricane 9200/S's own Web server (also called its HTTP server). In this case, you would want to use the Port Settings feature to assign a non-standard port number to the Hurricane 9200/S's HTTP server. Without a non-standard port number, the NAT rule would redirect your ISP's log in attempt to your

LAN HTTP server rather than to the HTTP server on the Hurricane 9200/S.

Thereafter, when your ISP wants to log on to your Configuration Manager, they would type your IP address in their browser, followed by a colon and the non-standard port number, as shown in this example:

**http://10.0.1.16:61000**

Your ISP may also have special circumstances that require changing the port numbers; contact them before making any changes here.

Follow these steps to modify port settings:

1. Log into Configuration Manager, click the Admin tab, and then click **Port Settings** in the task bar.

   The Port Settings page is shown in Figure 86.

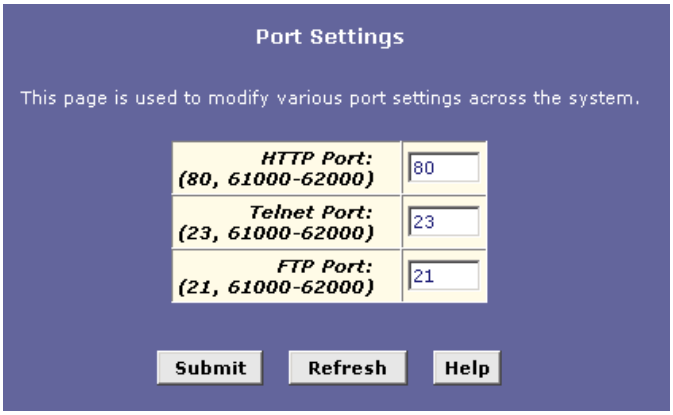



***Figure 86. Port Settings Page***

2. Type the new port number(s) in the appropriate text box(es) and click Submit.

   The default port numbers are shown in Figure 86. You can enter non-standard port numbers in the range 61000-62000.

3. Click **Commit & Reboot** in the task bar, and click Commit to save your changes to permanent memory.

4. On the Commit & Reboot page, click Reboot.

Note that the new settings will not be effective until you reboot the system.

# 19 Configuring Autodetect

Autodetect enables the modem to automatically detect and configure a valid ATM VC at startup. Autodetect eliminates the need to have users configure VC values as described in “Configuring the ATM VC” on page 56.

## How Autodetect Works

When enabled, Autodetect attempts to establish a DSL connection with the ISP using VC values (VPI/VCI) selected in either of two ways:

- from a pre-determined list preconfigured on the modem
- from the complete range of valid values

**Note**

*The method of operation is preconfigured by the ISP and cannot be changed using the Web-based interface.*

A valid connection is found when a PPP, EoA, or IPoA interface is found on the ISP's access server. If the initial VPI/VCI values do not detect a valid connection, then Autodetect tries again using the next set of available values. When a successful connection is discovered, that connection is used for the current session and the VPI/VCI values are "remembered" for initial use the next time the modem starts up.

## Autodetect Modes

Autodetect can be used to establish PPPoE, PPPoA, IPoA-1577 and EoA connections and can be configured in either of two modes: bridging mode and routing mode. These modes are specific to the Autodetect feature and are configured in addition to the system operating mode defined on the modem.

- When Autodetect is configured in bridging mode, it can detect the presence of PPPoE and EoA interfaces on the access server. In this mode, the modem must be configured as a bridge and a PPPoE or DHCP client is expected to be running on the LAN PC (behind the modem).
- When configured in routing mode, Autodetect can detect PPPoE, EoA, PPPoA, or IPoA-1577 interfaces on the access server. Autodetect searches for these interfaces in the order stated. Depending on the interface detected, Autodetect creates a PPP, an EoA, or an IPoA interface on the modem. In this mode, the modem is expected to be configured as a router.

## Configuring Autodetect

Follow these steps to configure Autodetect:

1. Log into Configuration Manager, click the Admin tab and then click **Autodetect** to display the Autodetect page:

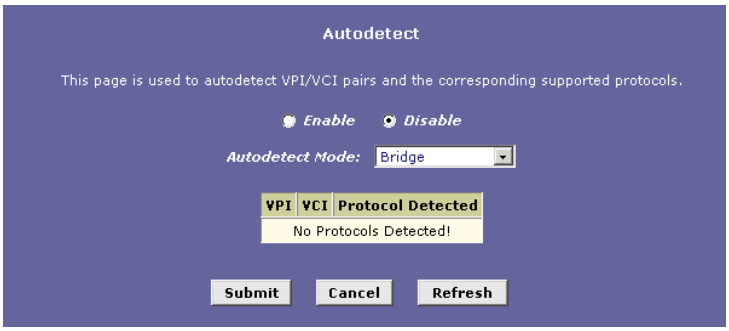



***Figure 87. Autodetect Page***

2. Select the appropriate Autodetect mode of operation, as described in the previous section, from the Autodetect Mode drop-down list.
3. Click the Enable radio button.
4. Click Submit.

   A page will display briefly to confirm your changes. Autodetect will not start searching for a valid connection until the modem is rebooted.
5. Click Reset.

   A warning message will display to inform you that the current configuration will be lost.
6. Click OK.

The modem will reboot and the Web interface will be temporarily unavailable. Upon reboot, Autodetect will begin searching for a valid VC and will create a PPP, an EoA, or an IPoA interface on your modem corresponding to the type of interface detected on the access server. You can monitor the success or failure of the Autodetect process by displaying the System Log page, located in the Admin tab.

If you disable Autodetect, be sure to commit your changes. Also, when Autodetect is disabled, you must manually configure ATM VC information as described in “Configuring the ATM VC” on page 56.

# A IP Addresses, Network Masks, and Subnets

## IP Addresses

Note

*This section pertains only to IP addresses for IPv4 (version 4 of the Internet Protocol). IPv6 addresses are not covered.*

IP addresses, the Internet's version of telephone numbers, are used to identify individual nodes (computers or devices) on the Internet. Every IP address contains four numbers, each from 0 to 255 and separated by dots (periods), e.g. 20.56.0.211. These numbers are called, from left to right, field1, field2, field3, and field4.

This style of writing IP addresses as decimal numbers separated by dots is called *dotted decimal notation*. The IP address 20.56.0.211 is read "twenty dot fifty-six dot zero dot two-eleven."

### Structure of an IP address

IP addresses have a hierarchical design similar to that of telephone numbers. For example, a 7-digit telephone number starts with a 3-digit prefix that identifies a group of thousands of telephone lines, and ends with four digits that identify one specific line in that group.

Similarly, IP addresses contain two kinds of information.

- *Network ID*
  Identifies a particular network within the Internet or intranet
- *Host ID*
  Identifies a particular computer or device on the network

The first part of every IP address contains the network ID, and the rest of the address contains the host ID. The length of the network ID depends on the network's *class* (see following section). Table 3 shows the structure of an IP address.

***Table 3. IP Address structure***

| | Field1 | Field2 | Field3 | Field4 |
|---|---|---|---|---|
| Class A | Network ID | Host ID | | |
| Class B | Network ID | | Host ID | |
| Class C | Network ID | | | Host ID |

Here are some examples of valid IP addresses:

Class A: 10.30.6.125 (network = 10, host = 30.6.125)
Class B: 129.88.16.49 (network = 129.88, host = 16.49)
Class C: 192.60.201.11 (network = 192.60.201, host = 11)

### Network classes

The three commonly used network classes are A, B, and C. (There is also a class D but it has a special use beyond the scope of this discussion.) These classes have different uses and characteristics.

Class A networks are the Internet's largest networks, each with room for over 16 million hosts. Up to 126 of these huge networks can exist, for a total of over 2 billion hosts. Because of their huge size, these networks are used for WANs and by organizations at the infrastructure level of the Internet, such as your ISP.

Class B networks are smaller but still quite large, each able to hold over 65,000 hosts. There can be up to 16,384 class B networks in existence. A class B network might be appropriate for a large organization such as a business or government agency.

Class C networks are the smallest, only able to hold 254 hosts at most, but the total possible number of class C networks exceeds 2 million (2,097,152 to be exact). LANs connected to the Internet are usually class C networks.

Some important notes regarding IP addresses:

- The class can be determined easily from field1:
  field1 = 1-126: Class A
  field1 = 128-191: Class B
  field1 = 192-223: Class C
  (field1 values not shown are reserved for special uses)
- A host ID can have any value except all fields set to 0 or all fields set to 255, as those values are reserved for special uses.

## Subnet masks

**Definition**
*mask*

*A* mask *looks like a regular IP address, but contains a pattern of bits that tells what parts of an IP address are the network ID and what parts are the host ID: bits set to 1 mean "this bit is part of the network ID" and bits set to 0 mean "this bit is part of the host ID."*

*Subnet masks* are used to define *subnets* (what you get after dividing a network into smaller pieces). A subnet's network ID is created by "borrowing" one or more bits from the host ID portion of the address. The subnet mask identifies these host ID bits.

For example, consider a class C network 192.168.1. To split this into two subnets, you would use the subnet mask:

255.255.255.128

It's easier to see what's happening if we write this in binary:

11111111. 11111111. 11111111.10000000

As with any class C address, all of the bits in field1 through field 3 are part of the network ID, but note how the mask specifies that the first bit in field 4 is also included. Since this extra bit has only two values (0 and 1), this means there are two subnets. Each subnet

uses the remaining 7 bits in field4 for its host IDs, which range from 0 to 127 (instead of the usual 0 to 255 for a class C address).

Similarly, to split a class C network into four subnets, the mask is:

255.255.255.192 or 11111111. 11111111. 11111111.11000000

The two extra bits in field4 can have four values (00, 01, 10, 11), so there are four subnets. Each subnet uses the remaining six bits in field4 for its host IDs, ranging from 0 to 63.

**Note**

*Sometimes a subnet mask does not specify any additional network ID bits, and thus no subnets. Such a mask is called a* default subnet mask*. These masks are:*

*Class A: 255.0.0.0*
*Class B: 255.255.0.0*
*Class C: 255.255.255.0*

*These are called* default *because they are used when a network is initially configured, at which time it has no subnets.*

# B Troubleshooting

This appendix suggests solutions for problems you may encounter in installing or using the Hurricane 9200/S, and provides instructions for using several IP utilities to diagnose problems.

Contact Customer Support if these suggestions do not resolve the problem.

| Problem | Troubleshooting Suggestion |
|---|---|
| **LEDs** | |
| *POWER LED does not illuminate after product is turned on.* | Verify that you are using the power cable provided with the device and that it is securely connected to the Hurricane 9200/S and a wall socket/power strip. |
| *ADSL LED does not illuminate after phone cable is attached.* | Verify that a standard telephone cable (called an RJ-11 cable) like the one provided is securely connected to the ADSL port and your wall phone jack. Allow about 30 seconds for the device to negotiate a connection with your ISP. |
| *Ethernet LED does not illuminate after Ethernet cable is attached.* | Verify that the Ethernet cable is securely connected to your LAN hub or PC and to the Hurricane 9200/S. Make sure the PC and/or hub is turned on.<br>Verify that you are using a straight-through type Ethernet cable to the uplink port on a hub or a cross-over type cable to a stand-alone PC. If you connected the device to an ordinary hub port (not Uplink), you must use a straight-through cable. (To check: hold the connectors at each end of the cable side-by-side with the plastic spring facing down. Looking at the wires from left to right, if the first, second, third, and sixth wires are the same color on the two connectors, then it is a straight-through type. On a cross-over type, wire 1 on one connector should be the same color as wire 3 on the other. The same is true of wires 2 and 6.)<br><br>Verify that your cable is sufficient for your network requirements. A 100 Mbit/sec network (10BaseTx) should use cables labeled CAT 5. A 10Mbit/sec network may tolerate lower quality cables. |
| **Internet Access** | |
| My PC cannot access Internet | Use the ping utility, described on page 175, to check whether your PC can communicate with the Hurricane 9200/S's LAN IP address (by default 192.168.1.1). If it cannot, check the Ethernet cabling.<br><br>If you statically assigned a private IP address to the computer, (not a registered public address), verify the following:<br>• Check that the gateway IP address on the computer is your public IP address (see "Quick Start Part 2 — Configuring Your Computers," for instructions). If it is not, correct the address or configure the PC to receive IP information automatically.<br>• Verify with your ISP that the DNS server specified for the PC is valid. Correct the address or configure the PC to receive this information |

| Problem | Troubleshooting Suggestion |
|---|---|
| | automatically.<br>• Verify that a Network Address Translation rule has been defined on the Hurricane 9200/S to translate the private address to your public IP address. The assigned IP address must be within the range specified in the NAT rules (see Chapter 4). Or, configure the PC to accept an address assigned by another device (see "Quick Start Part 2 — Configuring Your Computers"). The default configuration includes a NAT rule for all dynamically assigned addresses within a predefined pool (see the instructions in Chapter 8 to view the address pool). |
| *My LAN PCs cannot display web pages on the Internet.* | Verify that the DNS server IP address specified on the PCs is correct for your ISP, as discussed in the item above. If you specified that the DNS server be assigned dynamically from a server, then verify with your ISP that the address configured on the Hurricane 9200/S is correct, then You can use the ping utility, described on page 175, to test connectivity with your ISP's DNS server. |
| **Configuration Manager Program** | |
| *I forgot/lost my Configuration Manager user ID or password.* | If you have not changed the password from the default, try using "root" as both the user ID and password. Otherwise, you can reset the device to the default configuration by pressing & hold onto the Reset button on the back panel of the device for 5 secs (using a pointed object such as a pen tip). Then, type the default User ID and password shown above. **WARNING:** Resetting the device removes any custom settings and returns all settings to their default values. |
| *I cannot access the Configuration Manager program from my web browser.* | Use the ping utility, discussed in the following section, to check whether your PC can communicate with the Hurricane 9200/S's LAN IP address (by default 192.168.1.1). If it cannot, check the Ethernet cabling.<br><br>Verify that you are using Internet Explorer v5.0 or later, or Netscape Navigator v6.1 or later. Support for Javascript® must be enabled in your browser. Support for Java® may also be required.<br>Verify that the PC's IP address is defined as being on the same subnet as the IP address assigned to the LAN interface on the Hurricane 9200/S. |
| *My changes to Configuration Manager are not being retained.* | Be sure to use the Commit function after any changes. This function is described on page 45. |

# C Glossary

**10BASE-T** A designation for the type of wiring used by Ethernet networks with a data rate of 10 Mbps. Also known as Category 3 (CAT 3) wiring. *See also data rate, Ethernet*.

**100BASE-T** A designation for the type of wiring used by Ethernet networks with a data rate of 100 Mbps. Also known as Category 5 (CAT 5) wiring. *See also data rate, Ethernet*.

**802.11a** An IEEE standard for wireless communication providing bandwidth up to 54 Mbps and signals in a regulated 5 GHz range. 802.11a is a higher-cost solution but is less likely to be affected by signal interference from other devices.

**802.11b** An IEEE standard for wireless communication providing bandwidth up to 11 Mbps, comparable to traditional Ethernet, and signals in an unregulated 2.4 GHz range. 802.11b is a lower cost solution than 802.11a, but may be subject to signal interference from other devices operating in the same range such as microwave ovens or cordless phones.

**802.11g** An IEEE standard for wireless communication providing bandwidth up to 54 Mbps, and signals in the unregulated 2.4 GHz frequency range. 802.11g is backwards compatible with 802.11b but offers greater bandwidth for supporting simultaneous users and a higher maximum speed.

**802.1x** An IEEE protocol that specifies a sequence of messages and responses for authentication exchanges occur among ends user stations attempting to log on to a network, the network node that handles such requests, and an authentication server that stores user authentication data. *See also authentication server and RADIUS*.

**access point** In a wireless local area network (WLAN), an access point is a station that transmits and receives data (sometimes referred to as a transceiver). The access point often serves as the point of interconnection between the WLAN and a fixed-wire network, such as a DSL line or Ethernet network.

**accounting server** A server typically located within an ISP's network that collects data relating to user login attempts and service usage, often for the purpose of providing data for billing.

**ADSL** Asymmetric Digital Subscriber Line
The most commonly deployed "flavor" of DSL for home users. The term asymmetrical refers to its unequal data rates for downloading and uploading (the download rate is higher than the upload rate). The asymmetrical rates benefit home users because they typically download much more data from the Internet than they upload.

**ATM** Asynchronous Transfer Mode
A standard for high-speed transmission of data, text, voice, and

| | |
|---|---|
| | video, widely used within the Internet. ATM data rates range from 45 Mbps to 2.5 Gbps. *See also data rate*. |
| **authenticate** | To verify a user's identity, such as by prompting for a password. |
| **authentication server** | A server typically located within an ISP's network that stores the usernames, passwords, certificates, and other data needed to verify users logging on to a network. *See also accounting server*. |
| **binary** | The "base two" system of numbers, that uses only two digits, 0 and 1, to represent all numbers. In binary, the number 1 is written as 1, 2 as 10, 3 as 11, 4 as 100, etc. Although expressed as decimal numbers for convenience, IP addresses in actual use are binary numbers; e.g., the IP address 209.191.4.240 is 11010001.10111111.00000100.11110000 in binary. *See also bit, IP address, network mask*. |
| **bit** | Short for "binary digit," a bit is a number that can have two values, 0 or 1. *See also binary*. |
| **bridging** | Passing data from your network to your ISP and vice versa using the hardware addresses of the devices at each location. Bridging contrasts with routing, which can add more intelligence to data transfers by using network addresses instead. The Hurricane 9200/S can perform both routing and bridging. Typically, when both functions are enabled, the device routes IP data and bridges all other types of data. See also *routing*. |
| **broadband** | A telecommunications technology that can send different types of data over the same medium. DSL is a broadband technology. |
| **broadcast** | To send data to all computers on a network. |
| **DHCP** | Dynamic Host Configuration Protocol<br>DHCP automates address assignment and management. When a computer connects to the LAN, DHCP assigns it an IP address from a shared pool of IP addresses; after a specified time limit, DHCP returns the address to the pool. |
| **DHCP relay** | Dynamic Host Configuration Protocol relay<br>A DHCP relay is a computer that forwards DHCP data between computers that request IP addresses and the DHCP server that assigns the addresses. Each of the Hurricane 9200/S's interfaces can be configured as a DHCP relay. *See DHCP*. |
| **DHCP server** | Dynamic Host Configuration Protocol server<br>A DHCP server is a computer that is responsible for assigning IP addresses to the computers on a LAN. *See DHCP*. |
| **DNS** | Domain Name System<br>The DNS maps domain names into IP addresses. DNS information is distributed hierarchically throughout the Internet among computers called DNS servers. When you start to access a web site, a DNS server looks up the requested domain name to find its corresponding IP address. If the DNS server cannot find the IP address, it communicates with higher-level DNS servers to determine the IP address. *See also domain name.* |
| **domain name** | A domain name is a user-friendly name used in place of its associated IP address. For example, www.globespan.net is the domain name associated with IP address 209.191.4.240. Domain names must be unique; their assignment is controlled by |

| | |
|---|---|
| | the Internet Corporation for Assigned Names and Numbers (ICANN). Domain names are a key element of URLs, which identify a specific file at a web site, e.g., http://www.globespan.net/index.html. *See also DNS.* |
| **download** | To transfer data in the downstream direction, i.e., from the Internet to the user. |
| **DSL** | Digital Subscriber Line<br>A technology that allows both digital data and analog voice signals to travel over existing copper telephone lines. |
| **Ethernet** | The most commonly installed computer network technology, usually using twisted pair wiring. Ethernet data rates are 10 Mbps and 100 Mbps. *See also 10BASE-T, 100BASE-T, twisted pair*. |
| **filtering** | To screen out selected types of data, based on filtering rules. Filtering can be applied in one direction (upstream or downstream), or in both directions. |
| **filtering rule** | A rule that specifies what kinds of data the a routing device will accept and/or reject. Filtering rules are defined to operate on an interface (or multiple interfaces) and in a particular direction (upstream, downstream, or both). |
| **firewall** | Any method of protecting a computer or LAN connected to the Internet from intrusion or attack from the outside. Some firewall protection can be provided by packet filtering and Network Address Translation services. |
| **FTP** | File Transfer Protocol<br>A program used to transfer files between computers connected to the Internet. Common uses include uploading new or updated files to a web server, and downloading files from a web server. |
| **hop** | When you send data through the Internet, it is sent first from your computer to a router, and then from one router to another until it finally reaches a router that is directly connected to the recipient. Each individual “leg” of the data’s journey is called a hop. |
| **hop count** | The number of hops that data has taken on its route to its destination. Alternatively, the maximum number of hops that a packet is allowed to take before being discarded (*see also TTL*). |
| **host** | A device (usually a computer) connected to a network. |
| **HTTP** | Hyper-Text Transfer Protocol<br>HTTP is the main protocol used to transfer data from web sites so that it can be displayed by web browsers. *See also web browser, web site*. |
| **ICMP** | Internet Control Message Protocol<br>An Internet protocol used to report errors and other network-related information. The ping command makes use of ICMP. |
| **IGMP** | Internet Group Management Protocol<br>An Internet protocol that enables a computer to share information about its membership in multicast groups with adjacent routers. A multicast group of computers is one whose members have designated as interested in receiving specific content from the others. Multicasting to an IGMP group can be used to |

| | |
|---|---|
| | simultaneously update the address books of a group of mobile computer users or to send company newsletters to a distribution list. |
| **Internet** | The global collection of interconnected networks used for both private and business communications. |
| **intranet** | A private, company-internal network that looks like part of the Internet (users access information using web browsers), but is accessible only by employees. |
| **IP** | *See TCP/IP*. |
| **IP address** | Internet Protocol address<br>The address of a host (computer) on the Internet, consisting of four numbers, each from 0 to 255, separated by periods, e.g., 209.191.4.240. An IP address consists of a *network ID* that identifies the particular network the host belongs to, and a *host ID* uniquely identifying the host itself on that network. A network mask is used to define the network ID and the host ID. Because IP addresses are difficult to remember, they usually have an associated domain name that can be specified instead. *See also domain name, network mask*. |
| **ISP** | Internet Service Provider<br>A company that provides Internet access to its customers, usually for a fee. |
| **LAN** | Local Area Network<br>A network limited to a small geographic area, such as a home, office, or small building. |
| **LED** | Light Emitting Diode<br>An electronic light-emitting device. The indicator lights on the front of the Hurricane 9200/S are LEDs. |
| **MAC address** | Media Access Control address<br>The permanent hardware address of a device, assigned by its manufacturer. MAC addresses are expressed as six pairs of characters. |
| **mask** | *See network mask*. |
| **Mbps** | Abbreviation for Megabits per second, or one million bits per second. Network data rates are often expressed in Mbps. |
| **microfilter** | In splitterless deployments, a microfilter is a device that removes the data frequencies in the DSL signal, so that telephone users do not experience interference (noise) from the data signals. Microfilter types include *in-line* (installs between phone and jack) and *wall-mount* (telephone jack with built-in microfilter). *See also splitterless*. |
| **NAT** | Network Address Translation<br>A service performed by many routers that translates your network's publicly known IP address into a *private* IP address for each computer on your LAN. Only your router and your LAN know these addresses; the outside world sees only the public IP address when talking to a computer on your LAN. |
| **NAT rule** | A defined method for translating between public and private IP addresses on your LAN. |

**network** — A group of computers that are connected together, allowing them to communicate with each other and share resources, such as software, files, etc. A network can be small, such as a *LAN*, or very large, such as the *Internet*.

**network mask** — A network mask is a sequence of bits applied to an IP address to select the network ID while ignoring the host ID. Bits set to 1 mean "select this bit" while bits set to 0 mean "ignore this bit." For example, if the network mask 255.255.255.0 is applied to the IP address 100.10.50.1, the network ID is 100.10.50, and the host ID is 1. *See also binary, IP address, subnet, "IP Addresses Explained" section*.

**NIC** — Network Interface Card
An adapter card that plugs into your computer and provides the physical interface to your network cabling, which for Ethernet NICs is typically an RJ-45 connector. *See Ethernet, RJ-45*.

**packet** — Data bundled into a specific format to enable transmission on a network. A packet contains a payload (the data) and overhead information such as where it came from (source address) and where it should go (destination address).

**ping** — Packet Internet (or Inter-Network) Groper
A program used to verify whether the host associated with an IP address is online. It can also be used to reveal the IP address for a given domain name.

**port** — A physical access point to a device such as a computer or router, through which data flows into and out of the device.

**PPP** — Point-to-Point Protocol
A protocol for serial data transmission that is used to carry IP (and other protocol) data between your ISP and your computer. The WAN interface on the Hurricane 9200/S uses two forms of PPP called PPPoA and PPPoE. *See also PPPoA, PPPoE*.

**PPPoA** — Point-to-Point Protocol over ATM
One of the two types of PPP interfaces you can define for a Virtual Circuit (VC), the other type being PPPoE. You can define only one PPPoA interface per VC.

**PPPoE** — Point-to-Point Protocol over Ethernet
One of the two types of PPP interfaces you can define for a Virtual Circuit (VC), the other type being PPPoA. You can define one or more PPPoE interfaces per VC.

**protocol** — A set of rules governing the transmission of data. In order for a data transmission to work, both ends of the connection have to follow the rules of the protocol.

**RADIUS** — Remote Authentication Dial-In User Service
A protocol used to authenticate users dialing in or otherwise connecting to a network. RADIUS specifies the series of requests, challenges, and response messages required before a device can gain access to a network.

**RIP** — Routing Information Protocol
The original TCP/IP routing protocol. There are two versions of RIP: version I and version II.

| | |
|---|---|
| **RJ-11** | Registered Jack Standard-11<br>The standard plug used to connect telephones, fax machines, modems, etc. to a telephone jack. It is a 6-pin connector usually containing four wires. |
| **RJ-45** | Registered Jack Standard-45<br>The 8-pin plug used in transmitting data over phone lines. Ethernet cabling usually uses this type of connector. |
| **routing** | Forwarding data between your network and the Internet on the most efficient route, based on the data's destination IP address and current network conditions. A device that performs routing is called a router. |
| **SDNS** | Secondary Domain Name System (server)<br>A DNS server that can be used if the primary DSN server is not available. *See DNS*. |
| **SNMP** | Simple Network Management Protocol<br>A TCP/IP protocol used for network management, often performed from a remote site. |
| **SNTP** | Simple Network Time Protocol<br>An Internet protocol that specifies how a network can synchronize its time with a clock on the Internet. |
| **subnet** | A subnet is a portion of a network. The subnet is distinguished from the larger network by a *subnet mask* which selects some of the computers of the network and excludes all others. The subnet's computers remain physically connected to the rest of the parent network, but they are treated as though they were on a separate network. *See also network mask*. |
| **subnet mask** | A mask that defines a subnet. *See also network mask*. |
| **supplicant** | In the 802.1x protocol, a device that attempts to log on to a network by providing authentication information, which is compared to information stored on an authentication server. |
| **TCP/IP** | Transmission Control Protocol/Internet Protocol<br>The basic protocols used on the Internet. TCP is responsible for dividing data up into packets for delivery and reassembling them at the destination, while IP is responsible for delivering the packets from source to destination. When TCP and IP are bundled with higher-level applications such as HTTP, FTP, Telnet, etc., TCP/IP refers to this whole suite of protocols. |
| **Telnet** | An interactive, character-based program used to access a remote computer. While HTTP (the web protocol) and FTP only allow you to download files from a remote computer, Telnet allows you to log into and use a computer from a remote location. |
| **TFTP** | Trivial File Transfer Protocol<br>A protocol for file transfers, TFTP is easier to use than File Transfer Protocol (FTP) but not as capable or secure. |
| **TTL** | Time To Live<br>A field in an IP packet that limits the life span of that packet. Originally meant as a time duration, the TTL is usually represented instead as a maximum hop count; each router that |

| | |
|---|---|
| | receives a packet decrements this field by one. When the TTL reaches zero, the packet is discarded. |
| **twisted pair** | The ordinary copper telephone wiring long used by telephone companies. It contains one or more wire pairs twisted together to reduce inductance and noise. Each telephone line uses one pair. In homes, it is most often installed with two pairs. For Ethernet LANs, a higher grade called Category 3 (CAT 3) is used for 10BASE-T networks, and an even higher grade called Category 5 (CAT 5) is used for 100BASE-T networks. *See also 10BASE-T, 100BASE-T, Ethernet*. |
| **upstream** | The direction of data transmission from the user to the Internet. |
| **USB** | Universal Serial Bus<br>A serial interface that lets you connect devices such as printers, scanners, etc. to your computer by simply plugging them in. The Hurricane 9200/S is equipped with a USB interface (H9200 only) for connecting to a stand-alone PC. |
| **VC** | Virtual Circuit<br>A connection from your ADSL router to your ISP. |
| **VCI** | Virtual Circuit Identifier<br>Together with the Virtual Path Identifier (VPI), the VCI uniquely identifies a VC. Your ISP will tell you the VCI for each VC they provide. *See also VC*. |
| **VPI** | Virtual Path Identifier<br>Together with the Virtual Circuit Identifier (VCI), the VPI uniquely identifies a VC. Your ISP will tell you the VPI for each VC they provide. *See also VC*. |
| **WAN** | Wide Area Network<br>Any network spread over a large geographical area, such as a country or continent. With respect to the Hurricane 9200/S, WAN refers to the Internet. |

# Index


100BASE-T, 191
10BASE-T, 191
ADSL, 191
ADSL cable, 18
ADSL port, 18
Alarm page, 167
Alarms, 167
Asynchronous Transfer Mode. *See* ATM
ATM, 191
ATM VC – Add page, 57, 58
ATM VC Configuration page, 56
Attacks, 136
Autodetect
  configuring, 185
  overview, 184
Autodetect page, 185
Backup/Restore Config page, 180
BASIC NAT flavor, 130
BIMAP NAT flavor, 133
Binary numbers, 192
Bits, 192
Black List, 136
  managing, 138
Blocked Protocols page, 157
Bridge Configuration page, 68, 78, 79
Bridge filter
  example, 155
Bridge Filter Configuration page, 150
Bridge Filter Rule page, 151
Bridge Filter Subrule page, 153
Bridge filters, 150
Bridge forwarding table, 74
Bridgeable interfaces, 78, 82, 83, 85
Bridged Internet connection, configuring, 82
Bridge-Router AutoSense (BRAS), 85
Bridges
  overview, 74
Bridging, 192
  special features, 84
Broadband, 192
Broadcast, 192
Commit & Reboot page, 45
Computers
  configuring IP information, 20
Configuration Manager
  overview, 35
  troubleshooting, 190
Data packet, 117
Date and time, changing, 42
Download, 193
Default configuration, 32
Default gateway, 107
De-militarized zones, 141
Denial of Service, 136
DHCP
  defined, 93, 192
  device modes, 94
  setting operating mode, 101
DHCP Address Table page, 99
DHCP client
  defined, 93
DHCP Configuration page, 96, 101
DHCP relay, 192
  configuring , 94
  configuring device as, 100
DHCP Relay Configuration page, 100
DHCP server, 192
  configuring the device as, 95

defined, 93
modifying, viewing pools, 99
pools, 93
using a LAN device as, 94
using existing on LAN, 50
using ISP
as, 94
configuring, 94
viewing assigned addresses, 99
DHCP Server Pool - Modify page, 98
DHCP Server Pool—Add page, 96
Diagnosing problems
after installation, 34
Diagnostics page, 174
Diagnostics Page
Traceroute, 176
Diagnostics-Ping page, 175
*DNS*, 97, 103, 192
defined, 103
relay, 104
DNS Configuration page, 105
Domain name, 97, 192
defining for ADSL-Ethernet router, 44
Domain Name System. *See* DNS
DSL
defined, 193
DSL interface
IP address, 91
DSL Interval Statistics page, 173
DSL Parameters page, 170, 171
DSL Statistics page, 172
DSL Status page, 169
Dynamically assigned IP addresses, 93
EOA
defined, 65
EOA interface, 91
EOA Interface – Add page, 67
EOA page, 65
Eth-0 interface
defined, 33
Ethernet
defined, 193
Ethernet cable, 18
straight-through vs crossover, 189
Features, 15
Filter NAT flavor, 131
Filtering rule, 193
Firewall, 193
settings, 136
Firewall Blacklisted Hosts page, 138
Firewall Configuration page, 135
FTP, 193
Gateway
defined, 107
*Gateway*
*in DHCP pools*, 97
Hardware connections, 17, 18
Hardware IDs, 74
Home page (System View), 40
Home Tab, 39
Hop, 193
defined, 107
Hop count, 112, 193
Host, 193
Host ID, 186
HTTP, 193
HTTP port, modifying address, 182
IGMP, configuring on LAN interface, 52
Image Upgrade page, 161
Images
storing and restoring, 180
Internet, 194
troubleshooting access to, 189
Intranet, 194

IP address
in device's routing table, 108
IP address pools
modifying, 99
IP Address Table page, 91
IP addresses, 194
explained, 186
viewing device's, 91
IP configuration
static, 25
static IP addresses, 25
Windows 2000, 21
Windows 95/98, 23
Windows Me, 22
Windows NT 4.0, 24
IP Configuration
Windows XP, 20
IP data packet, 117
IP Filter Configuration page, 140
IP Filter Rule – Statistics page, 148
IP Filter Rule – Add page, 142
IP filter rules
adding, 142
examples, 147
settings, 143
IP filter sessions, 148
IP Filter Sessions page, 149
IP filters
viewing statistics, 148
IP Global Statistics page, 92
IP information
configuring on LAN computers, 20
IP Route – Add page, 110
IP Route Table page, 108
IP routes
manually configuring, 108
adding, 110
type, 109
IP Routes
defined, 106
IPoA Interface – Add page, 72
IPoA Interface Global Map page, 73
IPoA Interface Map page, 73
IPoA page, 70
ISP, 194
LAN, 194
LAN Configuration page, 51
LAN interface
configuring multiple, 92
LAN IP address, 49, 51
specifying, 50
viewing, 91
LAN port
default IP information, 25
LEDs, 194
troubleshooting, 189
Local Image Upgrade page, 178
Login
to Configuration Manager, 35
Loopback IP address, 91
MAC addresses, 75, 194
in DHCP Address Table, 99
*in DHCP pools*, 97
Management Control page, 164
Mask. *See* Network mask
Mbps, 194
Microfilter, 194
Modes
Bridging, 82
Routing, 81
Routing and Bridging, 83
ZIPB, 86
Modes, operating, 76
NAPT NAT flavor, 125

NAT, 194
adding rules, 125
BASIC flavor, 130
BIMAP flavor, 133
default configuration, 118
defined, 117
Filter flavor, 131
global settings, 119
NAPT flavor, 125
PASS flavor, 134
RDR flavor, 127
viewing performance statistics, 122
NAT Configuration page, 119
NAT Rule Configuration page, 122
NAT Rule Global Statistics page, 121
NAT Rule Statistics page, 122
NAT Rule—Add page - BASIC, 130
NAT Rule—Add page - Bimap, 133
NAT Rule—Add page - Filter, 131
NAT Rule—Add page - NAPT, 125
NAT Rule—Add page - Pass, 134
NAT Rule—Add page - RDR, 127
NAT Translation – Details page, 124
NAT Translations page, 123
Navigating, 37
Netmask. See Network mask
Network. *See* LAN
Network Address Translation. *See* NAT
Network classes, 187
Network ID, 186
Network interface card, 15
Network mask, 195
in DHCP address table, 99
Network mask, 187
NIC, 195
Notational conventions, 12
Operating mode
scenarios, 81
Operating modes
as displayed in the System View table, 76
overview, 74
ZIPB, 86
Packet, 195
Packets
filtering, 140
Pages
Alarm, 167
ATM VC - Add, 57, 58
ATM VC Configuration, 56
Autodetect, 185
Backup/Restore Config, 180
Blocked Protocols, 157
Bridge Configuration, 68, 78, 79
Bridge Filter Configuration, 150
Bridge Filter Rule, 151
Bridge Filter Subrule - Add, 153
Commit & Reboot, 45
DHCP Address Table, 99
DHCP Configuration, 96, 101
DHCP Relay Configuration, 100
DHCP Server Pool - Add, 96
DHCP Server Pool-Modify, 99
Diagnostics, 174
Diagnostics-Ping, 175
Diagnostics-Traceroute, 176
DNS Configuration, 105
DSL Interval Statistics, 173
DSL Parameters, 170, 171
DSL Statistics, 172
DSL Status, 169
EOA, 65
EOA Interface - Add, 67
Firewall Blacklisted Hosts, 138
Firewall Configuration, 135

Home (System View), 40
Image Upgrade, 161
IP Address Table, 91
IP Filter Configuration, 140
IP Filter Rule - Add, 142
IP Filter Rule - Statistics, 148
IP Filter Sessions, 149
IP Global Statistics, 92
IP Route - Add, 110
IP Route Table, 108
IPoA, 70
IPoA Interface, 72
IPoA Interface Global Map, 73
IPoA Interface Map, 73
LAN Configuration, 51
Local Image Upgrade, 178
Management Control, 164
NAT Configuration, 119
NAT Rule Add - BASIC, 130
NAT Rule Add - Bimap, 133
NAT Rule Add - Filter, 131
NAT Rule Add - NAPT, 125
NAT Rule Add - Pass, 134
NAT Rule Add - RDR, 127
NAT Rule Configuration, 122
NAT Rule Global Statistics, 121
NAT Rule Statistics, 122
NAT Translations, 123
NAT Translations - Details, 124
Port Settings, 183
PPP - Detail, 62
PPP Configuration, 59
PPP Interface - Add, 64
Quick Configuration, 30
Remote Image Upgrade, 179
RIP Configuration, 112
RIP Global Statistics, 114
SNMP Host - Add, 166
System Log, 168
System Mode, 80
System Modify, 42
User Config-Add, 162
User Config-Modify, 163
User Configuration, 161
Parts
  checking for, 16
PASS - NAT flavor, 134
Password
  default, 36
  *recovering*, 190
PC configuration, 20
PC Configuration
  static IP addresses, 25
Performance statistics, 92
Ping, 175, 195
Port, 195
Port IDs
  using with NAT, 129
Port numbers
  using non-standard, 129
Port settings, 182
Port Settings page, 183
Power connector, 19
PPP, 195
  settings, 60, 62
PPP – Detail page, 62
PPP Configuration page, 59
PPP interface, 91
PPP Interface – Add page, 64
PPPoA, 195
PPPoE, 195
Privilege levels, 161
Protocol, 195
Quick Configuration

logging in, 29
Quick Configuration page, 30
RDR NAT flavor, 127
Rebooting, 46
Remote Image Upgrade page, 179
Reset button, 46
Restoring an image, 180
RFC 1577 (IPoA), 70
RIP, 195
configuring on device, 112
overview, 111
viewing statistics, 114
RIP Configuration page, 112
RIP Global Statistics page, 114
RJ-11, 196
RJ-45, 196
Routable interfaces, 78
Routed and bridged Internet connection, configuring, 83
Routed Internet connection, configuring, 81
Routers
overview, 75
Routing, 196
Routing and bridging mode, 82
Routing Information Protocol. *See* RIP
Security levels
setting, 141
SNMP Host – Add page, 166
SNTP, configuring, 42
Software upgrades, 178
Stateful inspection, 145
Static IP addresses, 25
Statically assigned IP addresses, 93
Storing an image, 180
Submitting vs committing, 45
Subnet, 196
defined, 97
Subnet mask. See Network mask
Subnet masks, 187
System - Modify page, 42
System Log page, 168
System Mode page, 80
System requirements
for Configuration Manager, 35
System requirements:, 15
TCP/IP, 196
Telnet port, modifying address, 182
Testing setup, 34
Time and date, changing, 42
Traceroute, using, 176
Traps. *See* Alarms
Troubleshooting, 189
TTL, 196
Twisted pair, 197
Typographical conventions, 12
Upgrading software, 178
Upgrading the image, 178
Upstream, 197
USB, 197
configuring PC, 26
configuring IP on PC, 28
installing, 18, 19
installing driver, 26
USB cable
connecting, 27
USB port
configuring IP information, 53
User Config Modify page, 163
User Config-Add page, 162
User Configuration page, 161
User logins, managing, 161
User privelege levels, 161
Username
default, 36

VC, 197
VCI, 197
VPI, 197
WAN, 197
WAN interface
  configuring multiple, 92
  IP address, 91
WAN-to-WAN bridging, configuring, 84
Web browser
  requirements, 15
Web browser requirements, 35
Web browsers
  compatible versions, 35
Windows NT
  configuring IP information, 24
ZIPB mode, configuring, 86